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ABSTRACT

The preparation and use of data needed to make objective, useful comparisons in higher education are considered. The needs for comparative data in higher education, including demands for accountability and strategic planning, are reviewed. In addition, data-related problems are considered: problems of narrowness, misrepresentation, sameness, mediocrity, misperception, and costliness. Choosing a topic and unit of analysis and selecting among several possible types of comparison groups are addressed, with particular consideration to the development of the peer group as a comparison group. Typical uses of comparative data, such as for management control, planning, and financial comparisons are examined. The current issues regarding comparative data are considered, including: the major sources of data, the quality of some of these data, procedural and political issues, and the state of the analytic art. Attention is focused on secondary sources of data, including federal and state sources, and associations and institutions. Finally, the outlook for data-collection efforts at the federal and state levels is discussed, and likely future demands on institutions are assessed. Administrative guidelines regarding data quality and data presentation are included. (SW)

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An NCHEMS Executive Overview

Comparative Data for Administrators in Higher Education

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Paul Brinkman
and
Jack Krakower

1983

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About the Authors

Paul T. Brinkman—Senior Associate at NCHEMS since 1981, conducting research on peer-group analysis, indicators of institutional diversity, and trends in institutional financing ... assessing alternative procedures for estimating marginal costs at colleges and universities ... 1979-1980, Ph.D. in Higher Education Finance, University of Arizona ... 1972-1978, Director of Planning and Program Development, Director of Management Information Systems, and Assistant Professor of Philosophy, College of St. Benedict ... 1970-1971, Education Coordinator and Planning Director, Monmouth Community Action Program ... recent published papers include "Factors Affecting Instructional Costs at Major Research Universities" and "Cost Comparisons: Should They be Done?" (with L. Leslie).

Jack Krakower—Senior Analyst at NCHEMS since 1980, engaged in research design, statistical analysis, and data-base development ... 1979-1980, Senior Statistician, Department of Public Health, University of California at Los Angeles. responsible for data-base management and statistical analyses for a major cancer study ... 1978-1979, Senior Statistician, Department of Medicine, UCLA ... 1979, Ph.D. in Research Methods, UCLA ... publications include *Financing at the Leading 100 Research Universities* (coauthor), *A Comparison of Procedures for Determining Goal Priorities* (with R. Hoepfner), and "Regression Discontinuity Analysis" (with J. W. Keesling).

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CHAPTER 1

Overview

Comparisons of programs, institutions, and state systems of higher education are often made. Sometimes these comparisons strongly influence important decisions; sometimes they amount to little more than rhetorical gestures. But the trend is toward the former—and toward more comparisons. Therefore, comparative analysis is a proper concern of administrators and policymakers throughout American higher education. But few adequately understand its appropriate role and weight in decision-making. Hence this book, which is concerned with the preparation and use of data needed to make objective, useful comparisons.

General principles as well as specific issues are discussed, in light of two major premises that arise from the authors' experience with comparative analysis in higher education. The first is that the use of comparative data by institutions, system administrations, and state agencies frequently is reasonable and proper, perhaps unavoidable. Our second premise is that serious problems can attend the use of comparative data and that even in the best of circumstances, no comparison is perfect. These assertions may strike the reader as transparent truisms, safely made about almost any human activity.

We suggest that they be regarded somewhat like glass doors: easily seen through, but not without substance.

At the outset, comparative data must be distinguished from comparative information. *Data* may be quantities, numbers that represent measurements. Or data may be encoded observations, signifying by a symbol the presence or absence of certain characteristics. (Enrollment data are recorded as numbers; a student's religious preference is recorded by a code.) *Information* consists of data that are useful in one or more contexts, that inform someone about something, that reduce uncertainty in some way. To become useful information, the data may have to be combined in one or more ways or displayed in a particular form, though this is not always the case. To determine whether or not a planned level of overall institutional full-time equivalent (FTE) enrollment has been reached, only one number, a simple total, is needed. To know something about the pattern of increases and decreases in enrollment in the various student-major programs offered in colleges of arts and sciences, the total enrollment figure must be broken down to department-level numbers. Then each of those numbers must be compared to its counterpart number for the previous year. To know something about the trend in part-time student enrollment, total FTE enrollment must be compared to head-count enrollment; those numbers can be broken down (disaggregated, an analyst would say) and the segments manipulated in various ways to produce many-dimensioned information.

The important ramifications of the distinction between data and information are cogently discussed at more length in another volume in the NCHEMS Executive Overview series—*Data and Information for Executive Decisions in Higher Education*, by Dennis Jones (1982). Here, we focus on data in their role as the basic building blocks for most formal—that is, objectively grounded and analytically disciplined—comparisons in higher education. We also have a good deal to say about the procedures, processes, and political elements that can foster or impede the likelihood of comparative data actually becoming useful information for administrators.

OVERVIEW

The Case for Comparative Data

Comparative data are being used extensively at this time in higher education for several reasons. First, and most obviously, more data are available now than ever before. The gradual adoption of the view that data can become information useful for most planning and management activities, and the now wholesale adoption of computerized record-keeping systems, have created the abundance. The increased reliance on data for administrative purposes in colleges and universities has been motivated by both internal and external factors. Within institutions, recognition of the value of data about institutional performance has grown steadily. In the 1950s and 1960s, the increased awareness came largely because of rapid increases in the size of institutions. In the 1970s, financial stringency became a strong motivator. Institutional growth and then the multiplication of financial problems and complexities brought about an increase in the number of mid-level administrators—institutional researchers, planners, assistant deans, assistants to the presidents, financial-aid specialists, and so on. In most cases, their primary activities involve the production and use of data.

The external demand for data has more than kept pace, to the point where today the typical college or university administration feels overburdened with reporting tasks. From government and from private-sector sources alike, the requests keep coming: data are acquired about affirmative action, student aid, and general statistics on the federal side; state-level agencies want data relating to financial allocation and program distribution; the lobbying activities of higher-education associations call for another set of numbers; and the data needs of those who study higher education are steadily expanding. (At present, there are more than 80 graduate programs in the field of higher education, and any number of sociologists and economists are busy analyzing the behavior of colleges and universities.)

Nonetheless, demand has not outstripped supply. A great plenty of data remains at hand, much of it adaptable, at least in principle, to comparative analysis. Commonly made comparisons include faculty salaries at one institution vis-a-vis those at peer institutions, state-by-state appropriations per student, and the relative quality of graduate programs.

Another reason for the steadily expanding use of data in higher education is the significant advances made in the standardization of data collected by and from institutions. Standard definitions of data elements (for example, *full-time student*) and widely accepted accounting procedures are necessities if comparisons are to be substantive and reliable. Nearly three decades ago, Russell and Doi (1955), two pioneers in institutional analysis, spoke of a "crying need for reliable normative data on the expenditures of institutions of higher education" (p. 21). That need has yet to be fully met, either for financial data or for other kinds. But considerable progress has been made—notably the agreement reached in the mid-1970s by the National Association of College and University Business Officers (NACUBO), the American Institute of Certified Public Accountants (AICPA), and the National Center for Higher Education Management Systems (NCHEMS) that standardized revenue and expenditure categories and financial accounting procedures generally. So today's greater amounts of data have been made more uniform, which means that sound comparative analysis is more attainable than ever before.

Finally, the perceived need for comparative data has grown apace with the increase in viability of the data. To be sure, this need is perceived differently from various vantage points in the highly diverse higher-education community. However, some broad trends are enhancing to the utility of comparative data. The most important are increased systemization and coordination of higher education, more emphasis on performance measures and accountability, greater interest in long-range and strategic planning, and the increasing awareness of a need for greater management control.

The enormous expansion of American higher education in this century, especially since World War II, has been accompanied by a steadily increasing need to rationalize the allocation of resources and the division of responsibilities among institutions. This has been most markedly true in the public sector, of course, but many private institutions have felt the influence of this trend. The most visible postwar manifestation of the trend has been the proliferation nationally of state-level coordinating boards and consolidated governing boards. One or the other can be found in every state except Delaware, Vermont, and Wyoming. While public institutions are the main concern of coordination efforts, the interests and contributions of private institutions to a state's higher-education resource often are given significant consideration when policy is made. The authority of coordinating agencies varies widely from state to state, but the agencies seem to have in common a large appetite for comparative data on the institutions within their respective purviews. Harold Enarson (1979), former president of Ohio State University, has noted that the desire on the part of state governments to achieve equity in funding is a major reason for the extensive use of comparative data in the context of state coordination.

In public and private institutions alike, administrators always have been viewed as stewards of the resources they manage. But a public accounting at regular intervals has not been a part of the American tradition in higher education; in fact, some prestigious private institutions have long treated the president's annual report to the trustees as confidential. But open accountability has become the general rule over the past two decades, at least in the public sector, and private institutions in financial distress have been more than willing to document the extent of their trouble. The key role of higher education in the socioeconomic life of the nation means that it must be given substantial support. During the protracted period of financial stress and strain affecting all levels of governments, the relative performance of colleges and universities inevitably will remain under close scrutiny. This scrutiny extends to questions of effectiveness—that is, whether institutions are doing what is right and doing it well—as well as to questions of efficiency, which probe into how economically institutions are able to function.

Demand for accountability arises both internally and externally. Faculty have an abiding interest in their compensation and working conditions, in the quality of incoming students, in the adequacy of library resources, facilities, and equipment, and so on. Students are interested in the quality of instructional programs, degree requirements, the institution's placement record, and such. The regents or trustees want fact-grounded information with which to evaluate programs and the performance of the president. Externally, all funders have the right to an accounting for what is done with the resources they provide. Few administrators are hostile to the principle of accountability. But many are wary of providing it through the medium of comparative data, because they know that the most well-meaning comparison can be dangerously misleading.

Nonetheless, the demand for comparative data often is compelled by the absence of absolute standards against which to assess institutional performance. It is not inherently obvious what the minimum level of student outcomes or the student-faculty ratio ought to be, or how broad the curriculum ought to be, or how much the institution should pay faculty or charge students, or whether a particular department or institution is receiving its "fair share" of resources. A consensus may be operating with respect to extremes: a student-faculty ratio of 100:1 surely would be universally regarded as unacceptable. But generally there is no consensus about appropriate standards or levels within the range of options open to most institutions most of the time. A few rule-of-thumb standards for certain resources or capacities—square feet of classroom space per student credit hour, for example—are widely accepted. These usually were promulgated by an accrediting body or professional society. In most instances, the origin of such rules or standards can be traced to comparative data—usually data on the behavior of institutions thought to be exemplary.

In the absence of absolute frames of reference, higher education has no choice but to rely on relative standards to some extent. The situation is in some respects analogous to that in the cosmos, where temporal and spacial location can be determined and expressed only in relational terms. The idea of a relativity principle for higher education may sound quaint, but it does seem to reflect a basic feature of reality in the world of colleges and universities. The behavior of other institutions, their structure, performance, and methods of operation, both present and past, may constitute an imperfect and somewhat protean framework for comparisons. But it is nonetheless a framework within which useful understanding can be gained about one's own institution. This certainly is not the only kind of institutional understanding that is needed or can be obtained, nor necessarily the most important kind. But for certain issues, comparative data can be the source of valuable insights not otherwise obtainable.

Three more points should be made about comparative data and accountability. First, the demand for accountability in the absence of standard performance measures causes a perennial need for comparative data. Some of the evaluative data required to establish acceptable performance measures will necessarily involve comparisons. Second, the need for comparative data in this context is strong enough to virtually guarantee that sooner or later, comparisons will be made among departments, institutions, states, and even nations, whether or not those being compared desire it or carry out the analyses themselves.

The third point is a matter of authorial judgment. We think that on the whole, it is better for the institution (or other unit of analysis) to take the initiative in the comparison process, or at least to become a willing participant. Taking into account the complexities and potential problems that surround the use of comparative data, it seldom is wise to let someone else dictate the terms—the framework, assumptions, dimensions—of the comparison. Not to cooperate with (and possibly co-opt) the process is to risk being unfairly treated and subjected to misleading comparisons. This eventuality usually leads to a reactive mode and absorption with damage control.

So far, we have portrayed comparative data as mainly a consequence of developments that impinge upon administrators whether they like it or not. But it is really not so one-sided. After all, the very financial data requested by a coordinating agency may provide an institution justification for asking for additional funds. Moreover, comparative data can assist an administrator in holding others accountable, establishing performance standards, and accomplishing other management-control tasks. Comparative data can be especially helpful to administrators engaged in strategic planning.

By *strategic planning*, we mean essentially the planning and assessment that relate to institutional mission: What role in the large scheme of things can the institution (program, department) expect to play? What niche can it occupy in the marketplace? What services should be rendered, and for whom? What are the institution's strengths and weaknesses? Nearly all departments and institutions engage in these kinds of considerations to varying degrees. However, some institutions under public control are preempted from doing extensive strategic planning because state legislators, coordinating-board analysts, or system-level administrators in effect do it for them. Some prestigious institutions, on the other hand, are so well established in the marketplace, and so set in their ways, perhaps, that discussions of new or modified strategy would be superfluous. But for institutions seeking an identity, or some change in their role and scope to ensure survival, strategic planning has strong appeal. (George Keller [1983] provides some excellent commentary on strategic planning in higher education.)

In any case, comparative data can support or be integrated into strategic planning in several ways. Gathering and analyzing data on other providers and on the enterprise as a whole are part of the *environmental scanning* aspect of strategic planning. Such scanning yields data particularly relevant to goal setting. The comparative analysis reveals a range of empirically possible performance, providing a framework for envisioning an institution's future in concrete terms. Similarly, the *targeting and positioning* aspects of strategic planning often can be facilitated by appropriate comparative data. Indeed, the very nature of *comparative advantage*, which every strategic assessment should try to identify, requires that it be assessed through comparative analysis.

In higher education, some of the more common comparisons are akin to this type of strategic assessment. Tuition setting, when it is an institutional prerogative, usually will involve more than an internal assessment of revenue requirements. Tuition rates at other institutions nearly always are given at least some consideration. And some evidence suggests that comparative data on tuition rates influence institutional tuition policy in the public sector (Rusk and Leslie 1978). The same holds for the prices an institution is willing to pay for the services of faculty and staff: the institution's position on salaries and wages relative to comparable private-sector pay levels will make a difference in the caliber of personnel that the institution can hire and retain.

The evaluative side of strategic planning can also make use of comparative data. The usual question is this: Are we doing well or poorly in this or that area of endeavor? Internal data generally provide only part of the answer. To take a simple example, suppose that an institution has experienced growth in enrollment for some years. On its face, this trend would seem to reflect well on the institution. But much more will be revealed if the growth pattern is analyzed within the context of enrollment behavior at similar institutions. It makes a difference, both for understanding the past and for foretelling the future, whether an institution has been riding a wave or has somehow been able to move against a current. Again, the basis for insight is *relative performance*.

There are good reasons, then, for using comparative data in higher-education administration and management, even if it is not required. The rational allocation of resources and responsibilities, the establishment of a viable framework for accountability and management control, and the implementation of several aspects of strategic planning depend in part on comparative data.

Caveats

We have said more than once that using comparative data has its perils. Indeed, there are compelling reasons for not doing some kinds of comparisons, at least among institutions or among states. We discuss data-related problems in detail later on. Here we will make only general comments about the perils of narrowness, misrepresentation, sameness, mediocrity, misperception, and costliness.

It is one thing to use comparative data as a source of supplementary information, quite another to use it as the core of consideration. In the latter case, comparative data can promote a narrowness of understanding and outlook. This might not be so if comparative data were available regarding all conceivably important aspects of all colleges and universities. In fact, they are not available to anywhere near the ideal extent. So in proportion as reliance on comparative data increases, the field of vision may decrease. If 10 dimensions of comparison are important, but data are available on only 4, then the importance of the other 6 comparisons will sometimes be forgotten. Conscientious analysis and use of comparative data always proceed with lively awareness that the data are never as complete as they might be—and sometimes are only bits and pieces of what one would like to have.

On occasion, narrowness falls into outright misrepresentation. Higher education is particularly vulnerable to some types of comparisons because of its long-standing difficulty in assessing the outcomes of the educational process. (Howard Bowen [1980] usefully summarizes the predicament.) To the extent that the outcomes remain unknown or unmeasured, assessments of both efficiency and effectiveness are challengeable. Properly constructed, such assessments would constitute a type of cost-benefit analysis. Knowing just the costs involved is not enough. Nor is it enough to assess output solely in terms of quantities produced—the number of degrees granted or student credit hours generated. Instructional cost per student credit hour may be an interesting ratio to some, but its utility in comparative analysis is often open to challenge. Harold Hodgkinson, a leading light in research on higher education, once observed that "no one has ever felt, smelled, or heard, or seen a credit hour. A credit hour is simply a measure of time spent in a place of instruction in the presence of some instructional medium" (1976, p. 41). Unless we know the value of a credit hour (which varies, of course, with perspective), we cannot reasonably infer from the cost figure very much about the efficiency or effectiveness of the educational process. Again, as with the 100:1 student-faculty ratio we hypothesized, cost figures that are many multiples of those at peer institutions are a clear cause for alarm. But within the normal range of cost experience, the value of such comparisons is questionable at best and the chance of misrepresentation is high. Misrepresentation is particularly a threat when a number of parties and interests are free to interpret the data, including some having little familiarity with the aims and operations of the higher-education enterprise (McNeil 1972).

When institutions are gauging their behavior against that of other institutions, an unwelcome drift toward sameness may result. Diversity in higher education traditionally has been valued highly. If the use of comparative data promotes mimicry, more harm than good may result. But when such data are used properly in a strategic-planning context—so that, for example, institutions seek to exploit their comparative advantages—diversity is likely to be enhanced.

If there is a tendency to view average behavior as a desirable standard, then more than homogeneity may be in the offing. Homogeneity would increase, presumably, if institutions crowded toward either the top or the bottom of the scale, rather than the middle. By moving toward the middle, or norm, they may simply be entrenching mediocrity. Certainly they are settling for suboptimum performance. The issue is particularly relevant with regard to resource utilization. What is the virtue of having average student-faculty ratios, staff-faculty ratios, and expenditures per student? Coordinating-agency staff, trustees, faculty, and administrators will differ as to which end of the spectrum is desirable. Politically, therefore, the middle ground may be the safest. It may also seem appropriate on more substantive grounds, because of the limits of our knowledge regarding cost-effectiveness in higher education. Because outcomes are not adequately understood, it usually is difficult, if not impossible, to determine whether an institution with relatively low costs per student is highly efficient—or in fact underfunded. In the absence of definitive standards, perhaps average behavior does have value as a comparative standard. Nonetheless, "being average" is not, in and of itself, a goal that will inspire innovation and excellence.

Any sort of data may be erroneous or otherwise misleading. But comparative data are particularly vulnerable, for a long list of reasons that will be looked at more closely later. We cite here only the most common: comparative data are often derived from multiple sources; the rules for recording the data may be inconsistent across sources; the close familiarity that can be so helpful in spotting data errors is usually missing because one typically must depend on secondary sources. The severity of the threat to the integrity of a comparative analysis from possible errors in the data varies in part with the use and purpose of the comparison. To take one example, the threat is likely to be greater in a management-control context, where the analysis may require highly accurate data to be useful, than in a strategic-planning context, where data need not be so accurate (Gorry and Scott Morton 1971).

Finally, we must consider the cost of comparative data. It takes significant resources to generate, store, and analyze data. Assuring that the data are in a form appropriate for comparison purposes adds to the cost. And solid comparative studies usually take the time and talents of experienced analysts. In hard times, such as the early 1980s have been, the costs of building the necessary data bases and conducting comparative analysis should be accurately weighed against expected benefits.

Complexities

The complexity of higher education is mirrored in the preparation and use of comparative data about the enterprise. To begin with, choices must be made about the unit of analysis, the particular issue about which comparative data will be gathered, and the type of group that will be used for comparisons.

Unit of Analysis

Essentially, the choice is among four units. The first unit involves institutional *components*—programs, departments, colleges within a university, or other budget or activity centers within the institution. Cost analysis at an institution usually includes this type of internal unit-level comparison. Less frequently, departments or other activity units will be compared across institutions. Such matters as resource utilization, salaries, workloads, and quality are usually the issues in question.

Next most common, we believe, are comparisons between or among entire institutions (usually confined to single-campus institutions). Faculty-salary comparisons clearly top the list; they long have been routinized, principally through annual studies conducted by the American Association of University Professors (AAUP) and the National Center for Education Statistics (NCES). Comparisons of tuition rates, costs per student, expenditure patterns (distribution of expenditures by function), academic programs or services offered, and outcomes (for instance, degrees awarded across programs) also are frequently made. Periodically, the more prestigious institutions are compared on the basis of quality.

Third, comparisons among states have become the rule rather than the exception in recent years. Though often surrounded by controversy, interstate comparisons of financial support for higher education have become integral factors in the funding process in many states. Salaries, resource-utilization patterns, costs per student, and tuition rates, usually compared annually or biannually, are of primary interest. A comparison with other states normally is made when state-level officials consider major changes in a funding formula. (These formulas incorporate fixed, quantitative relationships, usually between number of students and allowable faculty positions, or number of students and a suggested funding level. They are used as a basis for deciding the appropriate level of funding for public institutions in roughly half of the states.) Occasionally, a state coordinating board or a legislative staff may compare the structure of its entire system of higher education with those of other states. Or it may compare a particular sector, such as the community-college system, with similar sectors in other states—with respect to unit costs, accessibility, and so forth.

Fourth, comparisons of higher-education systems in different countries are made occasionally. They are usually conducted by academics specializing in comparative education. The National Commission on Excellence in Higher Education was chartered by the Congress in 1982, to make international comparisons. Political issues have arisen regarding some Commission findings, such as the fact that the Soviet Union and Japan are producing far more engineers than is the United States. Historically, such comparisons have been potent—witness the comparisons between U.S. and German universities in the 19th century, which immensely influenced the development and character of graduate instruction in this country. International comparisons are likely to have continuing importance in our increasingly competitive yet increasingly interdependent world.

Issues

Comparative analysis can be applied to any number of management concerns, including tuition rates, salaries curriculum structure, clientele, workloads, productivity, outcomes, quality, unit expenditures, distribution of expenditures by function, unit revenues, distribution of revenues by source, rank and tenure structure, administrative structure, and governance structure. A complete list would be indefinitely long. Financial comparisons appear to be most frequently made—and more often than not, they create controversy. All of the issues we have listed are often the direct focus of a comparison. Instead, they may be examined for the sake of properly interpreting the meaning of some other data in the analysis. (Technically speaking, they would then be functioning as *intervening*, or *contextual*, variables.) Issues such as comparative expenditures per student across institutions normally ought to be looked at in light of comparative data on related characteristics. And the proportion of students enrolled in high-cost programs, the proportion of graduate students, and similar data would be important factors in interpreting per-student expenditures.

Comparison Groups

In addition to choosing a topic and unit of analysis, those engaged in a comparative analysis must also choose among several possible types of comparison groups. Sometimes the rationale for a comparison is that the units are all within a common *jurisdiction*—for example, the departments within an institution, the institutions within a state, or perhaps the institutions within an athletic conference. Another common reason for a comparison is *competition*. The level of analysis is most often institutional, since colleges and universities have abiding interest in their competitive status vis-a-vis students, faculty, and financial resources. In the case of jurisdictional groups, the units being compared may have little in common. The units in competitor groups are likely to be similar, but they need not be: a small private institution may compete for some students with a nearby state university. Another type of comparison group, which we will call an *aspiration* group, has quite similar analytical units. By definition, however, they differ from the comparing unit in at least one major regard—that which has occasioned the comparison. The disparity might exist in such things as faculty salaries or tuition. Usually, the comparing unit is interested in whether the gap should be closed. A fourth type is a *peer* group. Peer units are thought to be essentially similar with respect to contextual factors important to a particular analysis, if not more generally. Their overall similarity allows comparative data, say on resource utilization, to yield a certain amount of meaning that they otherwise would not have. Peer-group analysis is examined in some detail later, because it is potentially a rich source of significant information of many kinds but is hardest of all to do right.

So far we have been concerned primarily with *what* is possible by way of comparisons. The administrator must also consider the *how* and *what for* of comparisons. For our purposes, *how* refers mainly to the way in which the comparison group is developed. The procedure selected will depend in part on the type of comparison group required. For example, a statistical procedure is superfluous if inclusion in a comparison group is dictated solely on the basis of legal boundaries. On the other hand, one may have to rely on statistical procedures to determine the composition of a group of peers.

What for refers to the use and purpose of the intended comparison. They are likely to influence data requirements. For example, comparative data are occasionally used to generate number values for formulas. (Minimum salary levels for various positions and ranks may be determined by taking a percentage of the mean [average] salary levels at comparable institutions nationally, or regionally, or within a state.) For such purposes, the data need to be much more precise than if the comparison is intended to provide background information only. Similarly, a higher level of data accuracy is likely to be needed when the purpose is assessment of performance as opposed to strategic planning. In short, both desirable data properties and data requirements generally are a function of intended use and purpose. In turn, these requirements may also affect the choice of a method for developing the comparison group.

In addition, the appropriateness of a particular method of comparison, including the development of the comparison group, depends on another set of contextual matters—characteristics of the intended audience, political considerations, and other practical considerations. The intended audience includes everyone who is to receive the comparative report and perhaps act upon it. The credibility of the analysis may be put at some risk if the analysis is not fully understood by this entire audience. Understanding should extend to the general concept of the statistical method employed and the nature of the data (in the broad sense of accounting routines, typical assumptions, and such). Possible secondary audiences should not be overlooked. A report requested by the president may also end up being reviewed by the board of trustees or featured in the alumni newsletter. These possibilities may suggest something about the appropriate design for a comparative analysis—the range of issues covered under a general topic such as comparative student outcomes, perhaps, or the list of people to be given an opportunity to shape the study in some way.

When preparing data for analysis of virtually any kind, it usually pays to consider the enveloping political context. Totally innocuous comparative data (if such exist) are not worth gathering and disseminating. Useful data have the potential to make a difference—someone may benefit, another may be threatened by their use. Ideally, the interests of everyone with a stake in the comparison should somehow be represented in the process. This is nearly always unattainable, of course, but the political ramifications need to be thought through carefully. Being the more political animal, the administrator should assist and monitor the analyst in these matters.

Finally, basic practical questions remain: How much will the analysis cost, what data are available, and what sorts of analytical capability (people, software, hardware) are at hand? These questions are almost always relevant when requesting studies of data on one's own institutional experience. (Institutional researchers call them *empirical studies.*) They can be especially important for comparative reports, because those preparing the reports may have to go beyond their customary data base and analytical procedures to get the job done.

OVERVIEW

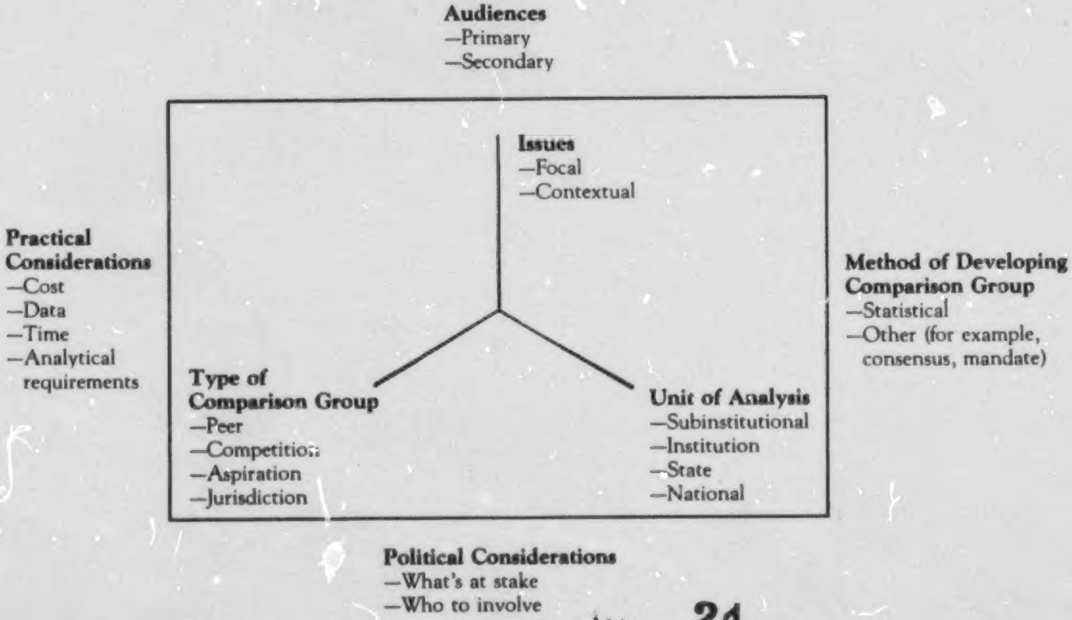
To sum up, comparisons are complex analytical undertakings, with numerous interrelated facets. The administrator-analyst team has little choice but to deal with selection of a unit of analysis, focal issues, a type of comparison group, a method of developing the comparison, and some practical considerations, such as cost. The other dimensions—the intended use and purpose of the data, the nature of the audiences for the analytical results, and various political matters—may not always be fully and mutually recognized and considered. We argue that they ought to be, however. Indeed, these latter aspects may be the more important ones in determining whether the comparative data that are generated go on to become information—that is, data useful to management. Figure 1 shows the many dimensions of the comparison process.

We have noted that the task of transforming data into information is the central theme of an earlier book in this series, by Dennis Jones (1982). The message there is straightforward. Transforming data into information is not automatic. It takes effort, insight, and experience. It typically can best be carried out by a competent information professional, described by Jones as having a threefold ability: "(1) to understand the management problem, (2) to appreciate the perspective from which the user addresses the problem, and (3) to identify and appropriately analyze the data that will best inform the user confronting the problem" (p. 48). These abilities are in addition to the data-related skills that we usually associate with an analyst.

The data-versus-information issue becomes more critical, if anything, when the data are comparative. Thus the present writers have a twofold objective. One is to help the administrator ask the right questions, formulate the problem as precisely as possible, and think through the comparative process as a whole. This will cut down on wasted time and effort, decrease the chances of serious error, and increase the chances of obtaining the desired information. Our second objective is to assist the administrator in grooming competent information professionals. Jones observes that such people are made, not born. Higher education will be the better as they increase in number and grow in ability. Administrators will have much to say about the extent to which that happens.

FIGURE 1

Dimensions of the Comparison Process


Audiences
—Primary
—Secondary
Issues
—Focal
—Contextual
Practical Considerations
—Cost
—Data
—Time
—Analytical requirements
Method of Developing Comparison Group
—Statistical
—Other (for example, consensus, mandate)
Type of Comparison Group
—Peer
—Competition
—Aspiration
—Jurisdiction
Unit of Analysis
—Subinstitutional
—Institution
—State
—National
Political Considerations
—What's at stake
—Who to involve

OVERVIEW

The next chapter considers various uses of comparative data. It deals with categories of use such as management control versus planning, differences between users (for example, public versus private institutions), typical uses, and pitfalls to avoid. Chapter 2 concludes with an extended discussion of financial comparisons, which have come to be the principal use of comparative data.

Chapter 3 is devoted to the development of peer groups. We have seen that various types of comparison groups can be used in generating comparative data. The peer-group option gets special attention in this book because it is chosen so frequently and because it often pushes data to, or beyond, the limits of acceptable use. The discussion of peer-group development also provides a context for elaborating on procedural issues, especially political ones, that are imbedded in any comparative analysis.

Chapter 4 includes a discussion of the kinds of comparative data available and what is known about the quality of that data. In chapter 5, the outlook for data-collection efforts at the federal and state levels is surveyed, and likely future data demands on institutions are assessed. We conclude with some ideas abut what administrators might do to influence the future use of comparative data.

CHAPTER 2

Uses of Comparative Data

Data are rendered neither good nor bad, valid nor invalid, useful, superfluous, or dangerous by being put to comparative uses. In consequence, allowable generalizations about comparative data usually are not really meaningful. In this chapter, therefore, we deal as much as possible in specifics. The specific uses of comparative data that we discuss will be seen, we think, as typical of the more common kinds, or categories, of use.

Categories of Use

Being held accountable on the basis of comparisons, invidious or otherwise, is a fact of life for most administrators in higher education today. Fortunately, comparative data offer opportunities to turn the demand for accountability into a two-way street paved with potential advantages.

External pressure for accountability comes from two sources: governing agencies and funders. In American higher education, governing boards of one kind or another are ubiquitous. They set the basic policies that govern the institution and select and evaluate the chief executive officer. Some of their basic concerns can be addressed with comparative data. Governing boards are concerned to know, for example, whether the teaching and administrative staff are being adequately compensated. The question often is addressed by reference to rates at comparable institutions (adjusted as necessary for cost-of-living differences). Are the institution's students developing as desired? Again, the achievements of comparable students at other institutions are relevant. Similarly, such questions as whether the institution is receiving its fair share of resources from funders, whether it is charging the appropriate amounts for services, whether it is spending too much on athletics, whether it is too liberal about the use of alcohol on the campus or too conservative about providing birth-control services at the student health center—all such issues can be more fully illuminated by data on practices at other institutions.

The authority of governing boards to require accountability inheres in their responsibility to guard the well-being of the institution and ensure that it pursues its mission with all due effort. Funders would seem to have at least equal power to demand accountability; in the public sector, indeed, the power to withhold funding in the absence of satisfactory accountability is theoretically the power to destroy. In practice, funders of all sorts and persuasions generally behave with marked circumspection, even when the accountability they seek eludes them. Funders vary greatly, however, in the amount and kinds of accountability they want. State governments often demand a great deal of accountability information. But usually their requests are confined to financial accounting—were the funds spent as planned?—rather than performance accounting—were the objectives met? Federal accountability demands tend to center on institutional performance with respect to the maze of issues subsumed by such umbrella terms as affirmative action, civil rights, and national security. Private funding, including individual philanthropy as well as foundation giving, often comes with no strings attached. All of this notwithstanding, questions about the cost of college and university operations and the benefits derived from the use of resources are in the air more and more. Because optimum performance levels are so difficult to pin down, data on performance at comparable institutions may well provide the only practical framework for assessment.

Understandably, the administrator may view as burdensome the perennial gathering of comparative data wanted by a governing board and funders. Yet this very data may be, in the same contexts, a weapon of advocacy. Comparative data can underscore the need for a new program, or additional staff, or higher salaries, or a greater share of available resources. How better to buttress an argument for a fair share of resources than to compare services rendered? Comparisons need not be confined to higher education. Rising salary rates for comparable positions in the surrounding city or region can be useful advocacy data. Relatively easy position matches can be made for clerical and maintenance staff and for some technical specialists, such as computer programmers. And for some faculty, particularly those in the professional schools, real-world counterparts can be found for salary comparisons that have advocative power. In the early 1980s, engineering schools have drawn considerable attention to their difficulty in keeping faculty by comparing what they can pay to engineering salaries in high-technology industry.

In general, the same sorts of questions asked by external groups are relevant to the administrator's internal responsibilities. Regarding outcomes, for example, one might ask: Do our students do as well on licensure examinations as students from other institutions in our state? Do other liberal-arts colleges award a similar proportion of degrees in career-oriented programs? Regarding expeditious use of resources, the questions might be: Can our attrition rate for freshmen be considered normal? Is our proportion of tenured faculty in the physical sciences extraordinary? Are our costs per square foot for physical-plant maintenance in line with costs at comparable institutions? Any administrator could add any number of such questions to the list without prompting. In each case, the data needed for the assessment will necessarily be comparative in nature.

Comparative data remain useful when the administrator's perspective shifts (ever so slightly) from accountability to control.

CHAPTER 2

Management control is exercised to ensure that policies are carried out and goals are met. At the state level, control usually takes the form of coordination, with its attendant reporting requirements. The state will have targets, although often only implicitly established, for student access, choice, and opportunity, and also for outcomes. Trained manpower has long been the primary outcomes concern at the state level, but interest in educational quality is increasing. To monitor progress toward these ends, coordinating boards gather a considerable amount of data from the institutions within their purview. (In some states, this includes private as well as public institutions.) The data bear on questions like these: Is access to higher education in geographic balance across the state? How significant is the differentiation among types of institutions, when parental income and other socioeconomic characteristics of students are compared? What is the difference in the net price paid by students in the public sector as compared to the private sector, or in research universities as compared to community colleges? How much duplication of effort exists among the state's colleges and universities? Are the differences in program quality at various institutions sufficient to justify cost differences?

State-level control may entail the collection of comparative data from other states as well. Faculty compensation rates, for instance, may be adjusted periodically on the basis of such comparisons. Some states express in comparative terms their policies regarding compensation and other control factors—"We should rank near the top" or "We should stay within 10 percent of the average in our region." The state of Florida has formulated various aspects of its long-range plans for higher education in terms of interstate rankings. In Kentucky, tuition at public institutions is indexed to charges at comparable institutions in other states (Viehland, Kaufman, and Krauth 1982).

Comparative data finds many uses in management control at the institutional level, and even at the departmental level. The example of tuition price comes immediately to mind because, particularly at private institutions, it has far-reaching implications for enrollment, student characteristics, institutional image, quality of instruction and services, and many aspects of resource allocation—all in addition to financial health. Private institutions, especially, keep informed about tuition levels and trends at comparable institutions, and in fact may have a policy to keep their tuition somewhere within the range charged by competing institutions. Comparative cost data have also been shown to be valued highly for management-control purposes (Collier 1980).

At the department level, informal comparisons certainly exert strong influence on an assortment of decisions about academic policies and management-control issues. What other departments are doing regarding course requirements for student majors, interdisciplinary and double majors, grade and performance requirements for honors programs—all such decisions are taken in full light of comparative practices within the institution. At the graduate level, comparisons are more likely to involve departments at other institutions. This has implications for top-level administration, of course: The chairman of physics may argue to the dean of arts and sciences that comparative data show a strong connection between faculty quality and a department's ability to attract federal research funds, which in turn facilitate faculty-building. The dean knows full well that the institution's reputation and image depend to an important extent on the reputation of its departments, and that departmental reputations are comparative matters.

We have eschewed generalizations, but it does seem that comparative data are most, and most often, useful in decision areas where policy and control considerations overlap. Since policy and control responsibilities overlap in the persons of nearly all administrators, and since nearly all would concede the virtual impossibility of exercising these responsibilities in isolation from one another, comparative data are not likely to influence solely a policy decision or solely a control action. Plainly, policymakers and managers at whatever level—state, institution, or department—need to know what's going on around them. How are others playing the game? How are other institutions interpreting "financial exigency" in connection with faculty-tenure policies? How closely are other states linking salary increases to changes in the cost of living? How many states have imposed enrollment caps on some, or all, of their institutions? And what impact have enrollment caps had on statewide enrollment totals and student migration? How do comparable institutions handle student health care, in terms of range of services and quality? What do other institutions do about sabbaticals? This small sample of possible comparisons tempts us toward another generalization—that in higher education, much comparative data will be of interest at all levels of administrative responsibility, from the academic department to the statewide coordinating agency. What one physics department seeks on the basis of comparative data, physics departments in other institutions within the state may demand: the cumulative effect can be as palpable at the state level as it is at the dean's level in each of the institutions involved. And few state-level decisions about higher education are so abstract that they escape notice at the department level.

Ultimately, we realize, policy must be established on the basis of mission and available resources. Nevertheless, knowledge of what others are doing helps to establish the range of alternatives. Sometimes, if the data are available, one can foresee with good accuracy what would be the results of various possible alternative policies. In other ways as well, comparative data can suggest what might result from a policy change. For instance, suppose that an institution is contemplating an upward shift in its admissions requirements. Common sense insists upon some effort to predict the effect of the new policy on enrollment. Surely it will be valuable to know the status of requirements at the other institutions in the recruitment area and their enrollments. If practical, it would be good to know the effect over time of a similar change in admissions requirements at similar institutions.

Planning, perhaps even more than policymaking per se, depends on a flow of comparative data. This is especially true when planning is strategic in nature—that is, when planning focuses on what the entity (state system, institution, department) should be in the future, what services it will provide, what niche in the world it will try to occupy. To be sure, certain first-order questions have to be answered without reference to data on the behavior of others. In particular, an organization needs to know what it could do within whatever immutable constraints are imposed on it, what its members are willing to do, and, in the most fundamental sense, what it ought to do. But the world in which a college or university must operate is competitive and interrelated. However worthwhile intrinsically, preferred activities cannot be sustained for long if there is no demand for them.

An axiom of the present time in higher education holds that an institution's key to survival (and eventual prosperity) is identifying its uniqueness. What are its competitive advantages? Comparative data help both to identify the advantages and to describe them concretely, so that they will be understood in an operational framework. Institutional goals and priorities can have inspirational value, even if they are impractical. But if they are to be used as actual operational guideposts, then they must be expressible in clear and concrete terms. Comparative data can help supply that concreteness.

Projections, estimates, and forecasts of one kind or another are basic to planning. All can draw support from comparative data. The likely success of a new program, or the continued success of an existing program, may depend on the availability of comparable programs at institutions within a particular region. The likely ability of an institution to maintain viable enrollment can be estimated on the basis of its drawing power vis-a-vis that of its competitors. (See Rowse and Wing 1982 for a good discussion of the relative drawing power of institutions.) Knowing results of efforts at comparable institutions to raise funds for capital investment can usefully inform the establishment of realistic goals for an institution's own capital-funds campaign.

Pricing decisions, as we have noted, are often grounded in comparative data. They are a primary means for determining what constitutes reasonable charges, for one thing. The freedom of public institutions to determine tuition prices is a variable, and seldom comparable to that of private institutions. Nonetheless, institutions in the public sector have a stake in influencing tuition policies and levels, which comparative data can help them do. Public institutions also have a voice in state-level decisions about funding formulas and appropriations to higher education; in both instances, a price for institutional services is being determined. The bottom line of a request budget is a price that the institution hopes to collect for the assortment of services it proposes to provide. State governments periodically consider, in all of its political ramifications, a set of pricing decisions for higher education—what tuition to charge resident students as opposed to nonresident students, and whether or not to differentiate tuition by level of instruction or type of program. The states are likely to seek normative (averaged) data to support their decisionmaking, while private institutions prefer data on competitors. The data are comparative in either case, of course.

Differences Among Users

There can be substantive differences, then, in the way that different types of institutions use comparative data, even when addressing the same sort of issue. The public-private distinction, in particular, ripples across all the categories of use discussed above. Public institutions are held accountable by both the state and students, but more regularly and more thoroughly by the state. At public institutions, therefore, comparative data generally will focus on levels of activity, efficiency of operation, and outcomes relative to stated purposes. At most private institutions, students have greater accountability leverage, because their tuition payments account for a greater proportion of operating revenues. Thus comparative data of interest to private institutions will focus more on net price, cost of recruitment, attrition, and outcomes relative to student aspirations (job placement, graduate- and professional-school placement, and so forth). Also, private institutions are quite sensitive to the views of alumni and private funders, and may have occasions to use comparative data that speak to their particular concerns—which sometimes are at odds with the concerns of current students.

Differences in institutional independence also affect data requirements. The locus of control, policymaking, and planning tends to be internal at private institutions. It is shifted somewhat toward the internal-external margin at public institutions—with considerable variation from state to state. Consequently, comparative data probably are most often used by public institutions for justification and advocacy. At private institutions, on the other hand, comparative data are more often used in analyses of competitor practices. But when private institutions seek state assistance, they too use comparative data as an advocacy tool, in the fashion of their public-sector counterparts. For example, the share of statewide enrollment carried by the private sector and its contributions to manpower development are likely to be emphasized in putting forward a case for assistance.

One difference between public and private institutions that seems less important than one might expect has to do with confidentiality. While data in the public sector are perforce public property, the same cannot be said for data in the private sector. But the confidentiality of data in the private sector appears to impede comparative analysis only rarely. Voluntary participation by private institutions in the Higher Education General Information Survey (HEGIS), a major source of comparative data, is quite high. On occasion, though, especially in a few highly competitive urban areas, data exchange among private institutions is deliberately limited. And some data collected in the public sector may in practice be hard to obtain. Trying to compare the full costs of athletic programs at major universities, for instance, surely would be tremendously difficult—and not just because of technical problems of analysis.

Still other differences among institutions cause variations in the use of comparative data. Major research universities, whether public or private, are so large and so complex that overall institutional comparisons are meaningful with respect to only a few factors, at best. More often than not in this sector of higher education, the comparisons of interest are those at the unit level—comparisons of undergraduate colleges, or law schools, or English departments. Data are available that allow comparisons of departments at well-known institutions on the basis of quality and effectiveness. (See Lawrence and Green 1980 for an evaluation of all but the most recent of these comparisons.) Smaller, more narrowly focused institutions find more utility in overall institutional comparisons. Topics such as sponsored-research expenditures per faculty member interest only a limited set of small institutions. Normative data on remuneration for teaching assistance is relevant to a wider, but still limited, set of institutions.

The environment can make as much difference as institutional characteristics in the way comparative data are used. A community college in a remote region where there is no other institution of higher education ordinarily will have data needs much different from those at an urban community college competing for a portion of its students with a variety of alternative providers. We said earlier that some situations are so competitive that data exchange can be inhibited; in such free-market environments, trade secrets are protected and data exchange is viewed as a threat. We may see more of this in the future, as more institutions begin to encroach on what was previously someone else's territory. Public institutions will work harder at recruiting and at securing private gifts. Liberal-arts colleges will seek out the so-called nontraditional student and offer much more in the way of occupational or professional programs. Paradoxically, even as competition increases and the value of comparative data is enhanced, the data itself may become more difficult to obtain.

One more environmental aspect bears mentioning. Many public campuses are part of a system of institutions. In this circumstance, system offices make system-level comparisons for funder-required reporting and for management control. On occasion, system offices will speak for all the component campuses in advocating additional resources or new programs. This arrangement contrasts sharply with the independent institutions that speak directly for themselves to funders. Of course, institutions operating in a system can use comparative data to protect the status quo or to advocate their own enhancement when negotiating with the system office. However, one would expect the range of data allowed as "evidence" to be somewhat circumscribed by system-related constraints.

USES OF COMPARATIVE DATA

Typical Uses

Up to this point, we have surveyed a wide range of possible uses for comparative data. But what sort of data are actually being used for comparative purposes, and by whom? Unfortunately, there has not yet been a comprehensive national study of this subject. However, there have been studies focusing on the use of data collected in the Higher Education General Information Surveys (HEGIS). The HEGIS surveys are discussed in greater detail in chapter 4; they are part of ongoing efforts by the National Center for Education Statistics to gather a variety of data on the entire population of American colleges and universities, which includes some 3,300 institutions. HEGIS constitutes the broadest source of comparative data now available. How it is used should be a good, although not comprehensive, indicator of how comparative data are being employed generally.

The most thorough study of HEGIS data was completed in 1980 (Andrew, Fortune, and McCluskey). Both institutions and state agencies were surveyed regarding the types of HEGIS data used, and why. For our purposes, a short summary of the results will suffice:

1. The most widely used data deal with enrollment, degrees awarded, finances, and faculty salaries, in that order—each type being used by more than 50 percent of the respondents.
2. The following types of data were used for making comparisons across institutions (numbers in parenthesis show percent of respondents that did so on one or more occasions): faculty salaries (49), enrollment by discipline (48), degrees awarded by discipline (45), enrollment by sex (44), degrees awarded by level (43), enrollment by race (40), financial status (40), degrees awarded by race (39), library quality (38), proportion of faculty tenured (38), residence and migration of students (36), degrees awarded by sex (35), and classified-employee salaries (31).
3. The issues regarding which HEGIS data were most frequently used included affirmative action, programs, costs per student, mix of students, and institutional status (finances, library, and so forth).

CHAPTER 2

A primary use of HEGIS data is to support policymaking at the national level. Chief concerns include enrollment projections, the status of higher education by sector (private and public), manpower planning, the financial condition of higher education, facilities planning, and library planning. While the sphere of institutional administrators does not embrace national policymaking, their institutions do support that policymaking by providing data—the same data, as it turns out, that make possible many comparisons at the state and institutional levels.

Partly in response to needs expressed by participants in the study of uses of HEGIS data, NCHEMS established in 1980 a service that makes comparative data readily available to the higher-education community. The accumulation of requests for this service, while by no means constituting a systematic sampling, does provide a fair empirical basis for drawing a few additional inferences about typical uses (and users) of comparative data. Since most of the data provided by NCHEMS derive from HEGIS, the service record may be viewed as a kind of addendum to the large study we have reviewed.

At this writing, the NCHEMS Information Service has generated about 1,500 reports on comparative data for about 150 individual clients. Three conclusions can be drawn. First, interest in financial data predominates. About three-quarters of the reports generated have been in standard formats—that is, preprogrammed and thus easily identified in terms of overriding theme or topic. Fully 60 percent of the standard reports requested have dealt with finances. Another 15 percent have concerned faculty salaries. The most frequently requested financial reports have dealt with revenues (by source) per student, expenditures (by function) per student, percent of revenues by source, and percent of expenditures by function. Twelve percent of the standard reports have drawn on enrollment data and 10 percent on degrees-awarded data. Most of the reports have displayed comparative data for single institutions, rather than aggregate data by institutional type (which also is available).

Granted the preponderance of interest in financial data, it is apparent that the primary uses of comparisons have been either budget analysis and financial planning (taking both terms in a broad sense) or what one might call financial advocacy, in which comparative data are used to argue for a change in funding or allocation levels.

Overall, comparison of information-service requests during the early 1980s with the uses of HEGIS data in the late 1970s (as reported by Andrew et al. [1980]) indicates that the use of comparative data to analyze resource-utilization patterns is increasing. A lesser but still substantial interest in structural issues—proportion of effort by instructional level, outcomes, and such—is evidenced in the number of requests for enrollment and degrees-earned data. In the custom reports prepared by NCHEMS, enrollment data are requested about as often as financial data.

Many other issues are no doubt being addressed with comparative data. A particularly creative use of such data was accomplished by staff at a state agency. They combined an index of institutional selectivity with listings of the out-of-state institutions to which their students had migrated. Together, these data sets gave a good indication of how many talented students had chosen to leave the state and the types of institutions that attracted them.

So far, about three-quarters of the organizations requesting comparative data from NCHEMS have been colleges and universities; the rest have been state agencies, research organizations, or private consultants. The institutions have been about evenly split between the public and private sectors, and between those with large and those with small enrollments. Most users have been either administrators (presidents, deans, financial officers, planning officers), administrative assistants, directors of admissions or personnel, or technical staff (institutional researchers, controllers).

Financial Comparisons

Financial comparisons at the institutional level seem as controversial as they are popular. In principle, they are no different from comparisons along various other dimensions of institutional behavior or structure. In practice, though, they often are questioned, and with good reason. Financial comparisons deserve consideration here at some length.

The main point of many financial comparisons is relative economy of costs: Can some institutions do a similar job for less money than others? Do some institutions get more for their money? Other common financial questions relate to the fair-share principle in budgeting. Are the faculty receiving their fair share of institutional resources? Is the instructional function getting its share? Is too much money being spent on central administration? How about the library? Another set of questions concerns sources of revenue, balance sheets and financial ratios, and prices charged (tuitions and fees primarily, room and board to a much lesser extent). And still more issues can be addressed under the general heading of financial comparison. There are sufficient commonalities among them so that the following commentary can be taken to relate fairly closely to all. Important exceptions will be noted.

Three conditions must be met to ensure that a financial comparison is not potentially misleading. First, the products and services generated by the institutions in the analysis must be fully known to those making the comparison. Second, all institutions in the analysis must use similar data-recording and accounting practices, or any discrepancies must be known so that the appropriate adjustments can be made. Third, any relevant environmental differences affecting the institutions compared must be known and taken into account.

If these conditions are met, interpreting comparative financial data is straightforward: the data can be taken pretty much at face value. In most instances, unfortunately, either the conditions are not met or considerable uncertainty exists about the actual state of affairs at the institutions in the comparison group.

Consider the problem of products and services. The mix provided at even a relatively small institution can be sizable and complex. An exhaustive knowledge of the institutions in the analysis is not required. But even a level of knowledge sufficient for the purposes of the financial comparison may be difficult to obtain with affordable effort. An abundance of evidence indicates that marked differences in program mix, student mix (level, status, ability), breadth of curriculum, the range of student services, and physical-plant operations are the rule rather than the exception, even among institutions of the same basic type. These differences affect per-student expenditures and the proportion of expenditures going to various functions and activities. The resulting financial variations among institutions that show up in the comparison may have nothing to do with relative economy or other performance factors. So the data cannot be taken at face value, and interpretations must be tempered.

The condition that data-recording and accounting practices be consistent can be violated in several ways. To begin with, inherent difficulties arise in the simplest counts, such as the number of students, the number of faculty, and the number of programs. The number of students is basic to many financial comparisons, as a means of putting expenditures or revenues on a unit basis. Institutions vary considerably, however, in the way they count students, especially with respect to full-time equivalency (so do the states; see Rhodes and Temple 1976). In addition, the fall-semester count, which in a general way functions as a benchmark in higher education, will not necessarily be equally representative across institutions of the true annual activity level that annual financial statistics are ordinarily supposed to reflect.

Determining the number of faculty is not always straightforward either. To someone unfamiliar with higher education, it might seem strange that a university would resort to rather arbitrary rules in determining how many faculty it has at a particular time. The mystery disappears when one considers the myriad ways in which students receive instruction or related services—formal classes, labs, research projects, dissertations, and so forth. The faculty are at the heart of an almost impenetrably complicated process. It consists of all manner of so-called joint inputs, involving students in various roles, interlocked teaching and research efforts, services jointly generated and consumed on and off campus, and so on. Unraveling that process for accounting purposes can be more than difficult. Potential problems with these most basic counts are part of the reason it is so hard to obtain a good match across institutions for financial comparisons. This is usually more true at comprehensive universities than at smaller institutions. In fact, a lengthy study coordinated by NCHEMS led to the conclusion that some comparability problems involving major research universities may simply be unresolvable (Topping 1979).

Prospects for standardizing accounting practices were considerably enhanced in 1975 when the National Association of College and University Business Officers (NACUBO), the American Institute of Certified Public Accountants (AICPA), and the National Center for Higher Education Management Systems (NCHEMS) came to agreement on a variety of accounting issues. Studies undertaken subsequently to assess the quality of HEGIS financial data revealed, however, that widespread discrepancies in data-reporting procedures were continuing (Minter and Conger 1979a,b,c). Conforming to national accounting practices is voluntary, and it may conflict with a system that an institution has successfully employed over a long period or, in some instances, with a system mandated by the state. Conformity seems to be improving slowly.

For publicly controlled institutions, the accounting problem can be further complicated by variations in the way in which state personnel systems are organized. For example, some states have a centrally administered, separately funded pension fund for all state employees. A particular institution's share of these expenditures can be calculated. But at the minimum, it requires an additional step that may or may not be included in the preparation of the institution's customary financial reports.

Differences in institutional environment can influence the meaning of financial data. The most direct effect comes from differences in the cost of living and regional wage and salary levels. These factors ought to be considered when comparing unit costs, unit revenues, and compensation. But this sometimes is difficult to do. For instance, cost-of-living data can be imprecise with respect to an institution not located in one of the 40 major metropolitan areas included in the Bureau of Labor analysis. Other environmental effects are not so obvious. At urban institutions, the category "Operation and Maintenance of Plant" may cover a range of services significantly different from those reported under the same rubric by rural institutions. Important differences in scheduling and classroom-utilization rates, especially in the evenings, may not be revealed in readily available comparative data, though they ought to be taken in account.

Some analysts extend environmental considerations much further. State or regional characteristics, in particular, are sometimes used in the early stages of developing comparison groups (see Dunham and Carter 1975; Teeter, Rawson, and Hoyt 1982). State wealth, the degree of urbanization and industrialization, population, and so forth, clearly are relevant to comparisons of state systems. Their value when comparing individual institutions is not so obvious. If the institutional data at hand are inadequate, state characteristics may serve as proxies for what is missing. But with adequate data on what the institution does from year to year, additional environmental data may be beside the point. Take the case of two public institutions that are well matched, except that one is in a poor state and the other is in a relatively wealthy state. The chances are great that the rich-state institution will have higher unit revenues (and expenditures) than the other. If the main concern in the comparison is relative costs, the greater economy displayed by the poor-state institution should not be discounted simply because it had fewer financial resources at its disposal. In other words, explaining a difference in costs is not the same as explaining it away. (This line of thought may be pursued in Bowen 1980, especially in his sections on the "revenue theory of cost.")

To summarize, the validity of a financial comparison among institutions can be threatened on three sides: hidden differences in the products and services of the institutions, disparities in their data-recording and accounting practices, and differences in the environment within which the institutions operate. These threats suggest that it might be wise just to forego financial comparisons. Perhaps. Yet as we observed at the outset, there are good, even compelling reasons for most institutions to make such comparisons. So the best course usually is to undertake financial comparisons in a way that maximizes their utility and minimizes the threats to their integrity and validity. The following check list may be helpful.

1. Take the process seriously. Put knowledgeable people to work on it. Do some prior thinking and planning: carefully determine the subject and use of the projected comparison, and decide how much imprecision can be tolerated in the data. Take political considerations into account when determining who should be involved in the comparison.
2. Acknowledge potential problems and threats to the validity of the comparison. Even a relatively minor problem can cause considerable harm if it is not taken into account at the outset. And proper problem recognition is the best assurance that those comparisons that ought to be abandoned will be, and that the rest will go forward on an acceptable basis.
3. Under virtually all circumstances, comparative financial data should be interpreted *conservatively*. Which is to say that such data should be thought of as general indicators rather than strict measures.
4. Use a multivariate approach. The more that financial data are considered in isolation from other facts, the greater the chances that those data will be seriously misinterpreted. Gather a sufficient amount of additional contextual data about the institutions in the analysis, so that their performance on a given financial dimension can be meaningfully interpreted.
5. The financial data in question should be subjected to rigorous verification procedures in certain situations. The more important the data are to the comparison, the greater the need for justification. Beyond that, what do the data themselves suggest? Unexpected variations from one institution to the next and odd-looking values or distributions suggest a need to find out more about the data.

State Comparisons

Among the most consistently controversial financial comparisons are those done at the state level of analysis. Few institutions are directly engaged in such comparisons. But public-sector institutions in particular can be affected by comparative analyses undertaken by coordinating boards, legislative staffs, regents' staffs, or independent analysts. Thus a few comments on statewide financial comparisons are in order here, in line with the general principles we have enunciated. First, comparisons among states are potentially as hard to do correctly as comparisons among institutions. There is no less complexity in handling the three potential trouble spots—products and services, data-reporting and accounting practices, and environmental differences.

Actually, the differences in products and services, or role and scope, among state systems of higher education can create more complications than usually are encountered in institutional comparisons. State-level analysis must be concerned not only about the large components in the respective state systems but also about the composition of these components. For example, a state system may embrace several institutions, some with single campuses and some with several. Moreover, significant differences in institutional role and scope may be present in each of the state systems included in the comparison. Policy differences across the states, such as the varying extent to which they fund higher education through student aid rather than institutional assistance, can also complicate comparisons between state systems. So interstate comparisons can entail all of the problems found at the level of institutional comparisons, but with the complications multiplied several times over.

When comparing institutions, the basic accounting issue is to determine instances in which administrators at a particular institution have elected to depart from standard accounting practices. When comparing states, the basic concern is to catch differences in the way states provide funds for higher education. Some states include tuition revenue in total state appropriations, some do not; some do, and some do not, allow institutions to keep recovered indirect costs. Many such differences must be looked for.

Contextual variables are especially important when state comparisons are made. Ranking states by per-capita appropriations for higher education is a case in point. These figures should be interpreted in light of such variables as each state's relative tax effort and tax capacity, cost of living, and independent higher-education resource. These come readily to mind. But less obvious differences among states, such as the age structure of the population and other demographic characteristics, also might appropriately affect interpretation of the significance of a state's rank with regard to per-capita appropriations for higher education (Lingenfelter 1982).

Comparative studies that focus on overall state appropriations to higher education are a likely source of misinformation, especially if a lot of precision is needed or expected. States can support higher education in numerous ways, and it is difficult to find data that capture all of the support in a consistent manner. Even if adequate data can be found, substantial interpretation problems will remain. Appropriations expressed on a per-student basis must be examined within a context of understood limits and tempered expectations. Are these actually peer states in a meaningful sense, or competitor states, or just a set of states? Is the purpose of the comparison to assess relative costs? If so, some control must be established over differences in the services purchased by the appropriations. D. Kent Halstead is trying to control for some of the differences with his concept of a "system cost index," (see Magarrell 1982). If appropriations are expressed on a per-capita basis, differences in state environments also become important to legitimate interpretation of the meaning of state rankings. (McCoy and Halstead [1982] go to great lengths to incorporate relevant features of the environment in their study of state finances.)

Comparative studies among states that focus on concerns more specific than overall funding levels usually are less subject to comparability problems. Lingenfelter (1982) lists some of these specific topics: "faculty salaries, degrees awarded, the availability of student assistance, participation rates, federal funding obtained, and professional graduates imported or exported" (p. 1852). He concludes that such issues have more utility than comparisons of gross funding levels. However, preliminary results of a recent survey by Hample (1983) indicate that a majority of respondents consider Halstead's comparisons of gross funding levels to be useful. Unquestionably, those comparisons as well as the data on state appropriations compiled by M. M. Chambers (and summarized in the *Chronicle of Higher Education*) receive a lot of attention.

At the state level, then, financial comparisons are similar to those at the institutional level and even more fraught with difficulties. Despite the difficulties, such comparisons will continue to be done, providing a needed frame of reference to lessen the impact of injurious provincialism. With higher education being one of their largest investments, the states are not likely to ignore what might be learned from the experiences of others.

CHAPTER 3

Developing Peer Groups

When considering comparisons among institutions, the tendency is to think immediately, and only, of comparisons among peers. Although various other kinds are possible, peer comparisons command most interest—and also put comparative data and comparative analyses to their severest tests. This chapter provides, therefore, an extended discussion of how to go about developing institutional peer groups. By way of preface, we consider the essential nature of comparisons.

In a general lexical sense, a comparison is an examination of two or more entities to determine similarities and differences. Dictionaries do not dwell on questions of inherent comparability among the entities or compatibility of the data. In higher education, however, conflicting opinions about the validity or propriety of particular comparisons arise because the comparability and compatibility issues are addressed from various viewpoints.

In considering whether a comparison makes sense, the crucial first concern should be the enveloping expectations or assumptions, sometimes specified but often implicit. Is it being assumed, for example, that the entities (departments, institutions, state systems) under comparison are essentially similar, and that what is being looked for are some minor differences? Or is it thought that the entities are dissimilar in important ways but still worth comparing along some dimension or other? Misunderstandings in this regard can lead to confusion in the development of peer groups and unnecessary skepticism about the results of the comparison. For illustration, consider a case in which faculty workloads are compared within a set of institutions that are peers with respect to several basic characteristics—enrollment, say, as well as research orientation and per-student expenditures. Against that, contrast a comparison of faculty workloads at institutions whose only common bond is that they fall within the same political boundary. Either comparison *may* be valid. But several kinds of trouble can be expected if the two comparisons proceed from the same set of assumptions.

The point can also be illustrated by a reference to the frequently heard notion that it is improper to compare apples and oranges. Obviously, apples and oranges can legitimately be compared in any number of ways: look into any book on nutrition. The admonition is really a comment about invalid assumptions: do not compare them on the assumption that they have no important differences—that an orange and an apple are the same as two oranges or two apples. Similarly, a workload comparison between community-college faculty and university faculty is questionable if one assumes that their workloads should be similar, merely because they both are in higher education. Without such an assumption to cloud the comparison, something useful may be learned from the differences in workload that are bound to show up.

Assumptions

In the development of institutional peer groups, then, consider first the assumptions that an analyst might reasonably make. A key analytic assumption acknowledges a pragmatic truth: no set of peer institutions is a set of pristinely identical institutions. To put it another way, an institution has peers in degree rather than in kind.

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Institutions are never altogether the same, and never totally different. Consequently, those who want to develop a peer group must delineate just how similar the institutions must be to be *similar enough*. The degree of similarity required will be a function of the purpose, use, and focal issue or issues of the comparison—in short, the *objectives* of the analysis.

The objectives of the comparative analysis also provide much of the context within which the analyst can decide *in what ways* the peer institutions must be similar. The number of dimensions, or institutional characteristics, that might be included when assessing overall institutional similarity is quite large. Because the relevance of a particular dimension depends on the objectives at hand, the analyst has a basis for paring down the large list, thereby creating a data set that can be both meaningful and manageable.

Those who make comparisons cannot avoid deciding, either overtly or tacitly, the appropriate degree and manner of similarity that peer institutions should exhibit. At the most fundamental level, therefore, human judgment plays a part in the development of any institutional peer group. This inescapable situation is another key element of prior awareness, for the analyst as well as everyone else involved in developing the comparison process. Recognizing the role of human judgment encourages the developers to begin by thinking, rather than by reaching for a recipe book. More fundamentally, it encourages the developers to consider *who* should be involved in making the judgments. If the developers could depend on being able to discover the whole truth and lay it at the doorstep of the user, then participation in the analysis would be a less important issue. But that is not the reality with peer-group comparisons, and those who ignore the limitations of such analyses should not be surprised if their results are ignored. Finally, recognition of the role of human judgment will help prevent the peer group from being oversold, from being represented as more than a construct.

If the objective of the comparative analysis influences the way the peer group is structured, it follows that a change in objective may dictate a change in peer-group composition. Over time, an institution may put together several peer groups, each appropriate to a particular analytic objective. This is not necessarily a heavy complication, in and of itself. The real problem lies in the way the fruits of peer-group analysis are typically used. How wise would it be to go before a funding body, such as a legislative committee, with a pocket full of peer groups, one for each issue (such as faculty salaries or appropriations per student)? On its face, that sort of maneuver would appear self-serving to anyone not well informed about the analytical process.

Practically speaking, then, there is good reason to incorporate multiple objectives, to the extent possible, when developing an institutional peer group. A truly all-purpose group may be beyond reach. But a general-purpose group, useful on most occasions, may be feasible for most institutions.

Variables

We have mentioned the task of determining which institutional characteristics, or dimensions, are relevant to the kind of comparison one wishes to make.

If a general-purpose peer group is wanted, probably it is best to focus heavily on dimensions that describe institutional mission and environment. Our experience suggests that most comparisons ultimately are directed to the assessment of resource-utilization patterns (student-faculty ratios, faculty-staff ratios, expenditures per student, proportion of expenditure by function, and so forth). If this is the case, those patterns probably ought *not* to figure in the selection of the peer institutions. Otherwise, a self-defeating circularity will be built into the analysis. In any case, the similarity of mission (ends) and environment among peer-group institutions is what makes the comparison of their resource utilization (means) interesting.

When the dimensions for comparison have been decided on, each must be operationally defined. That is, data must be identified to constitute the measure or measures of each dimension. Their identification can be complex. The dimension of "size," for example, could be represented by one or a combination of variables, including total head-count enrollments, FTE enrollments, numbers of degree programs, doctoral degrees granted, total expenditures, and the like. It may not be obvious which measure, or combination of measures, is best. A dimension such as "quality of the academic program" can present another sort of problem. Of the measures that come to mind, at least a few, such as reputation and faculty productivity, may generate controversy and perhaps weaken the credibility of the comparison process. (See Moden and Schrader 1982, and Smart, Elton, and Martin 1980, for examples of qualitative indices that have been used in a peer-grouping context.) The problem of specifying measures (variables) for each dimension is compounded by the need to have access to all of the relevant data for all potential peer-group institutions. The data must also have been collected according to standard definitions and procedures, so that they are compatible. (Practically speaking, standardization is nearly always a matter of degree.)

Relevance, acceptability, and availability are not the only major considerations in delineating the comparative-data set. A sometimes equally important consideration is the analytic procedure to be used on the data. Various options will be discussed later. Here it is enough to note that a list of a dozen or more variables almost surely will entail the use of multivariate statistical techniques, with their attendant costs, requirements for analytical capability, and process ramifications. What happens, for instance, to the confidence of a decisionmaker who has a large stake in the comparative analysis but to whom the technique looks like a black box?

Variables that operationalize comparative dimensions are based on data that may generally be viewed as falling into one of three categories, depending on the kind of measurement scale employed—*nominal*, *ordinal*, or *interval*. Nominal-level data have no magnitude and are discontinuous: they distinguish entities simply as being similar or different with respect to specified characteristics. Examples of nominal variables include institutional control (public/private), religious affiliation (yes/no, or Catholic, Protestant, Jewish) and medical school on campus (yes/no).

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Ordinal-level data convey information about the relative ordering of a set of objects on a continuum but nothing about their true magnitudes. For example, we might ask students to indicate whether their parents' income is less than $10,000 (category 1), between $10,000 and $20,000 (category 2), or greater than $20,000 (category 3). With this information we would know that every student in category 3 was from a family whose income was greater than the family income of any student in either category 1 or category 2. For purposes of analysis, any two students in the same category are effectively treated as being from families of similar income levels.

Most institutional characteristics pertinent to peer comparisons exhibit interval-scale properties. That is, their numeric values represent the true magnitude of the properties under consideration. The "interval" label refers to the fact that measurement units denote equal quantities along the continuum of interest. For example, the difference between 2,000 students and 3,000 students is the same as the difference between 4,000 students and 5,000 students. Interval-level data are subject to all arithmetic processes—addition, subtraction, division, and multiplication—without distortion of the data. Such information as revenues and expenditures, numbers of students, and number of degree programs are examples of such data.

Given the characteristics of ordinal and interval-level data, the analyst can always create an ordinal-level variable out of interval-level data. This is done by imposing cut-off or threshold levels on the latter, so as to create a set of ordered categories. Income data, which is inherently interval-level, is often treated in this manner—as we ourselves did in illustrating ordinal-level data.

We are interested in this tripartite distinction—nominal, ordinal, and interval—because of the ways in which these different kinds of variables can function in various analytical processes. As an example, if having landgrant status, a nominal variable, is considered essential for inclusion in an institutional comparison group, some 97 percent of the nation's colleges and universities are immediately eliminated from further consideration. On the other hand, if FTE enrollment, an interval variable, is deemed an essential comparison dimension, at least one additional step will have to be taken.

Somehow, differences in enrollment will have to be categorized with respect to an inclusion rule. This may be done directly by establishing threshold levels. It might be decided, for instance, that any institution with not less than 6,000 or more than 9,000 students could be considered for the peer group. Alternatively, the interval variable might be used within a multivariate statistical routine, so that institutions with similar enrollments would be lumped together, so to speak, without recourse to precise thresholds.

In gist, we may say that the proper selection of comparative dimensions in the peer-grouping process requires a prior knowledge of the objectives of the comparison, data availability, analytical capabilities, and process requirements. Absent this prior knowledge and conceptual preparation, a haphazard and even disfunctional list of variables is liable to be drawn up, and another iteration may be required. A second iteration is not necessarily bad, especially if it is intentional. Unplanned, it is detrimental to the credibility of the whole undertaking. The old rule applies: take time to do it right—or make time to do it over.

Analytical Procedures

The choice of analytical procedure, like the selection of variables, should take into account various aspects of the comparison as a whole: purpose, use, audience, available resources, and number of variables to be included in the analysis. The analytical procedures discussed in this section include sectoring, and cluster, factor, and discriminant analysis. All have been used, alone or in combination, to develop institutional peer groups in higher education. We believe that most empirically based peer-grouping efforts incorporate some version of one or more of these four procedures. The latter three are statistical routines that appeal more to the researcher than to the administrator. To a researcher, the main task in peer-group analysis is to divide the universe of institutions into groups of similar institutions. (See Terenzini, Hartmark, Lorang, and Shirley 1980; Elsass and Lingenfelter 1980.) The administrator, however, asks: "How can I find a group of institutions that are similar to mine?" The questions are certainly related, and in fact, the researcher's approach will provide a possible solution to the administrative problem: one of the groups isolated by the researcher will contain the administrator's institution. The questions are different, nonetheless, and the analytical procedures they beget are usually different, too. We discuss the more research-oriented statistical procedures (in the plainest language at our command) because at some point, the administrator may have to deal with the results of studies employing them. Moreover, some administrators may find that one or another of these procedures offers a viable alternative for addressing their particular concerns. To our brief conceptual overview, we have added appropriate references for those who want a more definitive and technical understanding.

Sectoring

We speak of institutions as belonging to either the public or private sector. Of course, they can be assigned to numerous other kinds of sectors, or categories, whose members are characterized, for instance, by the presence or absence of a medical school or an engineering school on the main campus, or by having (or not having) a religious affiliation or status as a landgrant institution, or by being a single-sex institution or a traditionally black institution. In such cases, the sectoring procedure can only be used with nominal variables. Rarely, therefore, will sectoring alone produce a peer group. The chance of that happening depends, of course, on the objectives of the comparison—but also on whether the comparing institution happens to be usefully characterized by the nominal variables at hand.

The power and applicability of sectoring in peer-group analysis can be increased substantially by using it in conjunction with a threshold approach to one or more interval variables. The notion of a threshold means that an institution is in or out of a peer group, depending on where it lies on an interval scale. For instance, a comparing institution may decide that only institutions with endowment earnings of more than $100,000 annually can be considered peers. In this manner, one can add to the nominal variables mentioned above virtually any desired institutional characteristic that can be specified in terms of interval variables. The peer group itself can be described by the values attributed to each of the variables that delineate group membership: it might be defined as consisting of all institutions that meet the following criteria: public, landgrant, integrated medical school, 20,000 or more FTE students, $20 million or more in research expenditures, and 30 or more doctorates awarded annually. Other criteria would yield a quite different peer group: private, Methodist affiliation, southeastern United States, highly selective admissions policy, fewer than 1,500 FTE students, four-year degrees accounting for 90 percent or more of all degrees awarded, with less than 20 percent in professional fields.

With the threshold modification, sectoring is a fast, efficient way to develop a peer group around a given institution. The logic of its operation is readily understood by those who are not statisticians and is therefore relatively easy to employ in most decisionmaking processes. In ideal circumstances, perhaps, all interested parties would come together to decide which variables to use and, in the case of interval variables, what the threshold levels should be. Bringing all the right people together may sometimes be a formidable undertaking. But when it is accomplished, the tasks assigned to these people are straightforward, and what is subsequently done to the variables they select is quite clear.

From the perspective of institutional processes, the sector-threshold approach does have a couple of potential weaknesses. One inheres in the very fact that it is so readily made a part of the decisionmaking process—which means that it also can be readily politicized. The effect of each variable in the analysis will be definite and quite apparent, thus opening the selection process to game-playing of one kind or another. Two, the inherent arbitrariness of the approach may become a point of attack for anyone unhappy about the resulting peer group. Threshold levels, in particular, are vulnerable. After all, if institutions with 1,500 or fewer students are acceptable as peers for a school with 1,400 students, how can one argue persuasively that an institution with 1,510 students is thereby not a peer? (In either case, the analyst may reasonably be expected to defer to the human-relations skills of the administrator in determining who shall conduct the defense.)

We have observed that the administrator and the researcher usually have somewhat different interests when developing peer groups. A related issue should be mentioned in conjunction with the sectoring-threshold technique. It so happens that this technique is the basis for most of the classification systems that have been developed for reporting on American higher education. The Carnegie Classification System is best known. But the classifications developed by the National Center for Education Statistics (NCES), NCHEMS, and the American Association of University Professors (AAUP) also are widely used. Each classification is based on a handful of variables, such as control, level of degrees awarded, breadth of curriculum (the presence of a medical school, in particular), amount of research, and number of students. And each system distinguishes among only a few types of institutions, so that national trends can be monitored in manageable fashion.

From the standpoint of an individual institution, groupings suitable for national reporting may or may not constitute suitable peer groups. We have seen that the degree of institutional similarity required is always a function of the objectives of a particular comparative analysis. Generally, a comparing institution will desire more institutional similarity than is exhibited in a typical national reporting category such as "comprehensive universities." It ought never to be assumed that a national reporting category will adequately delineate a set of peer institutions, especially when an institution intends to compare its data with that of other individual institutions. Comparing one's data with group norms for an appropriate category of institutions within a national reporting scheme would be less objectionable, but still not best practice.

Cluster Analysis

This is a general name for a set of statistical procedures designed to help identify groups of entities that have similar attributes. Cluster analysis is used where no a priori or theoretical information about the structure of groups is available or assumed (SAS 1979). Clustering procedures are designed to work so that the entities in a given cluster will be more like one another, with regard to the attributes or variables being evaluated, than the entities in any other cluster. There are various alternative clustering algorithms (see Hartigan 1975). But in essence, clusters are formed by calculating the statistical distances between the entities and then grouping them on the basis of those distances. (When this is done graphically, like entities will appear in groups, or clusters.) The distances may be measured between values for institutional characteristics (for example, number of students or number of degree programs). And they may be measured between combinations of variables representing constructs of those characteristics such as doctoral emphasis expressed as a percentage of graduate degrees awarded or applied-science emphasis similarly measured. Institutions can be rank-ordered on the basis of their relative distance from a target institution, or the entire study sample (universe) of institutions can be divided into clusters of relatively similar institutions.

Cluster analysis overcomes at least one of the major problems associated with sectoring approaches. Clustering routines can be employed with continuous (interval-level) as well as discrete (nominal-level) data. Hence they do away with the need for the analyst to make arbitrary judgments about the appropriate threshold levels or cut-off points for interval variables included in the analysis. Such judgments, we have pointed out, are possible sources of political controversy.

But clustering approaches also have drawbacks, four of which deserve mention here. First, most of the readily available clustering programs can handle only a limited number of cases and variables; few will handle more than 20 variables on even the largest computers. Second, as the number of variables increases, the probability increases that essentially the same dimension will be redundantly specified. As a result, a particular dimension may be disproportionately weighted in the analysis. For example, total enrollment and total number of programs are likely to be highly correlated; either one, therefore, could be taken as a measure of size. If both are used in a set of five variables, say, then the dimension of size would account for at least 40 percent of group variation—and perhaps even more, depending on how total enrollment and total number of programs correlate with the other variables in the analysis. Of course, this is not a problem if it reflects analytic intent.

A third drawback is that most clustering procedures, unless otherwise specified, give equal weight to all variables entering the analysis. For complicated technical reasons, this requirement could, in certain circumstances, create misleading appearances of similarity or difference between some institutions. The analyst can avoid this situation by assigning suitable weights to the variables. Unfortunately, doing so introduces an arbitrariness much like that encountered when establishing thresholds as part of a sectoring technique.

Finally, cluster analysis does not in itself provide definitive solutions. Human judgment is still involved in deciding both how and where group boundaries will be drawn. Sometimes the clustering routine will reveal clear-cut, natural boundaries—but not often for the entire sample being studied.

Factor Analysis

Like cluster analysis, this term subsumes a fairly large number of procedures (Nie, Hull, Jenkins, Steinbrenner, and Bent 1975). The most distinctive characteristic of factor analysis is its data-reduction capability. That is, it enables one to see whether some underlying pattern of relationships exists that will allow the data to be reduced to a smaller set of factors, as they are called. Factor analysis typically is used as a preliminary step to obviate some of the problems associated with overspecification—in other words, to avoid having numerous variables that measure the same dimension. It also accommodates for the limitation on the number of variables that can be used in a sector or cluster analysis. Ideally, each factor measures a different, unique institutional characteristic. And the factor scores assigned to each institution ordinarily will be far fewer in number than the original, raw variables with which the analysis begins. Factor analysis usually is used in conjunction with other techniques and generally is not used to generate groups of similar entities directly. One could in fact do so, however, by using what is called a Q-factor analysis (see Stephenson 1953). The more common approach is to employ a sectoring or cluster analysis to generate peer groups from the factor scores. For example, total number of students, total number of degrees, and total expenditures for educational and general purposes are descriptors whose values are likely to be highly correlated. If this turns out to be the case, these descriptors will generate a *factor*, which the statistical technique isolates and which the analyst subsequently would no doubt interpret as "size." Each institution in the analysis is given a score that locates it on the size dimension. This score replaces the three original descriptors, thus reducing the data set employed in further analysis.

Numerous computer programs are available for performing factor analysis. But the cookbook statistician should be aware of employing this technique. Proper use of factor analysis involves recognition of the assumptions implied and problems inherent in the factor-analysis model. In some circumstances, they may constitute serious limitations on the value of the technique. (Comrey 1973 and Harman 1967 are among the many basic texts providing excellent discussions of factor analysis and its fundamental assumptions.)

We would be amiss not to mention a few common problems with factor analysis, even at the risk of becoming too technical. First, as with most statistical techniques, the reliability of results from factor analysis is directly related to sample size. Comrey (1973) believes that analyses based on samples of fewer than 300 cases have only fair reliability. Second, an underlying assumption of factor analysis is that the variables employed have normal distributions. Our experiences suggest that with respect to colleges and universities, many of the variables of interest will be seriously skewed, truncated, or bimodal. Third, we have no precise mathematical way to determine how many factors should be extracted. Thus one can never be certain whether too many, or too few, have been extracted. An inappropriate choice may distort the factor solution.

A statistical procedure called spatial-configuration analysis combines factor analysis and multidimensional scaling to form peer groups. The technique has been used primarily by researchers and is not included in most statistical software packages. So we will not say more about this procedure here. The interested reader will find good discussions in Cole and Cole (1970) and Smartet al. (1980).

Discriminant Analysis

This statistical procedure is not used directly to form peer groups in the first instance. Its most frequent application has been after cluster analysis was used to identify institutions most like (or unlike) one another. Clustering algorithms seldom provide complete, definitive group structures. In many cases, indeed, the analyst ultimately decides where group boundaries are to be drawn. Having thus assigned institutions to groups, the analyst may then employ discriminant analysis to assess both the "goodness of fit" between institutions and their assigned groups, and the relative statistical contribution or influence of variables employed in the cluster analysis. Like factor analysis, discriminant analysis may be performed with a number of computer programs now available. We caution, however, that use of the technique by those not well versed in statistics may lead to interpretation difficulties. (The interested reader will find discussions of discriminant analysis in a number of texts on multivariate statistics, including Tatsuoka 1971, Finn 1974, and Bock 1975.)

Illustration

Much of the preceding discussion has been abstract. So at this point, the reader will perhaps appreciate a fairly comprehensive, if hypothetical, illustration of how an institutional comparison group might be developed. The procedure we have chosen to illustrate is often used at NCHEMS when we respond to requests for assistance in finding institutions appropriate for comparisons. The procedure is not particularly sophisticated; it is relatively easy and inexpensive to implement. And it will allow us to demonstrate the application of some of the principles of development we have discussed.

At our hypothetical university, the rationale for seeking comparative data is to get a wider perspective on whether the proportion of total expenditures allocated to instruction is reasonable. That proportion has been gradually declining for several years, a fact that is causing growing concern among the faculty. There is consensus that it would be useful to know what has been happening at similar institutions. Our institution has not made extensive use of comparative data in the past, and no list of similar institutions, acceptable to all concerned parties, has been compiled. General agreement exists that some empirical basis should be used to determine which institutions belong in a comparison group.

The first task is to decide what institutional characteristics, or variables, are to be used to establish similarity. Several questions are involved, because the issue has to be addressed in both general and specific terms. The general problem is to determine a basis for selecting variables. The two major options usually are to use either institutional mission or resource-utilization patterns, or both. The former is most often appropriate, because resource-utilization patterns are so often what is to be evaluated. Indeed, this is the case with our hypothetical institution. One could start by finding a set of institutions with utilization patterns similar to those at the comparing institution. But this would indicate little if anything about the reasonableness of the patterns. Data on the respective institutional missions still would be needed to give comparative meaning to their utilization patterns. We submit, then, that in most instances, one ought to start by stipulating that at the minimum, institutional similarity will mean similarity of mission.

What specific variables can be used to characterize institutional mission, or "role and scope"? Table 1 displays the modest list of variables with which we begin at NCHEMS when the comparing institution is a four-year college or university. Group A criteria

TABLE 1

Criteria for Comparison Institutions

For________________________________

A. Selection

Characteristics	Your Institution	Check one	
		Very Important	Not Important
Control (Public/Private)	Public	X	
Landgrant	No	X	
Medical School	No	X	
Urban/Rural	Rural	X	

B. Ranking

Characteristics	Your Institution	Range	Check one		
			Very Important	Important	Not Important
Total FTE Enrollment	8,055	6,000–10,000	X		
% AA Degrees	8.1	0–15		X	
% BA Degrees	77.5	60–90	X		
% MA Degrees	14.4	9–20	X		
% Ph.D. Degrees	0	0–1	X		
% 1st Professional Degrees	0	0–0	X		
% Degrees in Professional Fields	77.0	60–85		X	
% Research Expenditures/ Instruction Expenditures	.002	0–.1		X	
% Part-time Headcount	17.4	8–30		X	

include nominal variables that identify an institution in clear-cut fashion: for instance, an institution either has or does not have a medical school as part of its operation—a fact that has great consequences for resource utilization. The list of identifying variables could include such features as religious affiliation (either yes-no, or in terms of a specific affiliation), single-sex enrollment, and predominantly black enrollment. Group A includes an urban-rural variable that may be a proxy for some aspects of institutional mission. It also may reflect certain environmental pressures on an institution that could affect the way resources are utilized. In a similar vein, regional location might be important, or the selection might be limited to institutions within specified states.

Group B variables in table 1 are of the interval type; they must be assigned ranges to function in the analysis. Again, one might want to add variables, such as the percent of minority-group students, or an index of admissions selectivity, or a particular program emphasis (especially if the comparing institution can be readily identified in that fashion). Group B includes the particular variables shown partly because they have clear implications for resource utilization. They also are representative of the issues that consistently have come forward in our own research efforts at NCHEMS to describe institutional mission by analyzing 100 and more variables, using factor analysis.

We have said that the variables shown in table 1 are appropriate for four-year institutions. Another set is required for two-year colleges. However, some overlap will occur, among both the nominal and interval variables, with those shown in table 1. The most significant differences have to do with program and degree-level descriptors.

The next step is to use the variables to generate a list of possible comparison institutions. In the NCHEMS procedure, Group A variables are used as *selection* criteria. For each nominal variable checked "important" by the comparing institution, a yes-no decision rule is inserted in the computer program used to facilitate selection. Our hypothetical comparing institution is publicly controlled and deems that characteristic important in selecting peers. Therefore, all private institutions are eliminated from consideration forthwith.

The nominal variables thus typically provide a quick way to pare down the list of possible comparison institutions. This point may seem trivially obvious. At NCHEMS, it is in fact important, because our data base includes all of the more than 3,300 colleges and universities included in the HEGIS surveys. The elimination of some institutions from further consideration at the outset helps in making the project more manageable.

Group B variables are used to rank-order the remaining institutions in terms of their relative "closeness" to the comparing institution. A candidate institution will either land within or miss each of the ranges established by the comparing institution. The candidate institutions are assigned points for each miss, and a point total for each institution is calculated. In addition to this simple sum, a weighted sum is calculated, using the importance scale. A miss counts one-half point if the variable is only "important" to the comparing institution, rather than "very important," and no points are added for a miss on an unimportant variable. This weighted sum is then used to rank-order the candidate institutions. Table 2 shows the rankings for 33 of the institutions that were most similar to our hypothetical comparing, or target institution, following the criteria set forth in table 1.

Table 2 shows that six of the candidate institutions have the requisite nine characteristics, all falling within the corresponding ranges of the target institution. Institution 7 misses the range for percent of part-time students, and institution 8 has too low a percent for degrees and professional fields. Neither characteristic is considered "very important" by the target institution, so the weighted sum assigned to institutions 7 and 8 is less than the simple sum. In the next group, 9 through 20, each institution misses on one very important characteristic, and so on. In analyzing such a list, the comparing institution likely would eliminate some of the institutions shown. For instance, institution 10 awarded 2 percent of its degrees at the doctoral level, and institution 24 had a rather high ratio of separately budgeted research to instruction expenditures. Perhaps both could be eliminated, since these figures missed the specified ranges by wide margins. The extent of a miss normally would be brought into consideration at this point—manually, so to speak, since it is not included in the automated, computer-based matching routine. The comparing institution might also now decide to change the range limits on one or more variables, thereby rearranging the rankings, or to add variables, which also would reconfigure the group of possible comparison institutions generated by the computer.

We advise those who engage in the sort of sectoring-plus-threshold approach illustrated in tables 1 and 2 to work toward a final comparison group of 15 to 20 institutions. A group of that size is small enough to make the gathering of additional data on the member institutions a task of reasonable scope, should more data be needed. It is also large enough to dampen the effects of bad data, if such data are present in subsequent analyses. Suppose a peer group of 20 institutions is used in addressing the problem we set for our hypothetical institution, the target institution in table 2: Is an appropriate proportion of resources going to instruction? One of the institutions might happen to be at the mean proportion for the group, let's say .45. But it might erroneously report a figure of .54 instead (a 20 percent error). The net effect would be to change the mean proportion for the group from a correct figure of .45 to an incorrect .4545. The erroneous mean proportion, which is the normative information sought by the comparing institution, is only in error by 1 percent—not enough to seriously mislead anyone under most circumstances.

Finally, we encourage institutions bent on comparisons to use the team approach in developing both the initial criteria and the final peer group. Administrators and faculty on any campus can provide a lot of information about other institutions. Why not make use of that information to help ensure the validity of the overall process? Clearly, the relatively few data elements employed in the process we have illustrated leave much unsaid. Knowledgeable people can often fill in the gaps. And, as we have previously stressed, it's just good strategy to involve the concerned parties from the outset rather than presenting them with a fait accompli, hoping that they will accept the judgments and compromises imbedded therein. For an example of a successful team approach involving potential adversaries, see Teeter et al. (1982).

TABLE 2

Possible Comparison Institutions for Target University
Public, Non-Landgrant, No Medical School, Rural
Very Impt = %BA, %MA, %DR, %FP, Res: Instr, TotFTE
Impt = %AA, Res: Instr, %PT HC, %Degs Prof Fields
Iteration #1

Institution Name	Weighted Sum	Sum	FTE Students	%BA Degs	%MA Degs	%PhD Degs	%1st Prof Degs	%AA Degs	%Degs Prof Fields	Res: Instr	%PT HC
Target	—	—	8055	77.5	14.4	0.0	0.0	8.1	77.0	.002	17.4
1	.0	.0	9701	81.[illegible]	18.3	0.0	0.0	0.0	64.3	.004	14.0
2	.0	.0	9234	74.7	15.5	0.3	0.0	9.5	65.8	.075	19.8
3	.0	.0	8060	75.2	13.6	0.0	0.0	11.2	69.7	.013	26.2
4	.0	.0	8457	77.3	22.3	0.4	0.0	0.0	72.8	.073	22.1
5	.0	.0	6162	89.9	10.1	0.0	0.0	0.0	73.5	.019	21.2
6	.0	.0	8210	87.4	10.3	0.0	0.0	2.3	66.1	.021	15.8
7	.5	1.0	6699	74.2	15.7	0.0	0.0	10.1	69.1	.010	32.0
8	.5	1.0	9789	84.5	15.5	0.0	0.0	0.0	55.9	.036	9.1
9	1.0	1.0	8104	82.7	17.3	0.0	0.0	0.0	71.3	.041	17.7
10	1.0	1.0	9601	76.2	19.6	2.0	0.0	2.3	69.8	.080	25.9
11	1.0	1.0	2767	83.4	13.5	0.0	0.0	3.1	73.6	.011	19.1
12	1.0	1.0	11731	82.8	17.2	0.0	0.0	0.0	74.4	.016	18.3
13	1.0	1.0	4453	76.5	18.7	0.0	0.0	4.8	69.1	.007	26.0

Institution Name	Weighted Sum	Sum	FTE Students	%BA Degs	%MA Degs	%PhD Degs	%1st Prof Degs	%AA Degs	%Degs Prof Fields	Res: Instr	%PT HC
14	1.0	1.0	4430	83.8	12.5	0.0	0.0	3.8	78.8	.002	22.8
15	1.0	1.0	5468	81.9	18.0	0.0	0.0	0.1	80.2	.005	20.8
16	1.0	1.0	4754	83.1	12.0	0.0	0.0	4.8	75.5	.041	16.7
17	1.0	1.0	4946	85.2	14.8	0.0	0.0	0.0	66.3	.008	12.3
18	1.0	1.0	11257	83.6	14.9	0.8	0.0	0.6	69.4	.009	12.4
19	1.0	1.0	4453	86.2	13.8	0.0	0.0	0.0	77.0	.013	8.2
20	1.0	2.0	6984	80.4	19.6	0.0	0.0	0.0	94.9	.018	7.4
21	1.5	2.0	6743	90.9	9.1	0.0	0.0	0.0	51.2	.041	23.8
22	1.5	2.0	4473	77.6	19.0	0.0	0.0	3.4	64.4	.002	32.4
23	1.5	2.0	11646	64.5	19.0	0.0	0.0	16.5	69.8	.012	22.8
24	1.5	3.0	7638	77.8	5.7	0.3	0.0	16.2	72.2	.399	4.2
25	2.0	2.0	6563	72.1	23.5	0.0	0.0	4.4	74.9	.024	21.1
26	2.0	2.0	6506	68.7	28.3	0.0	0.0	3.0	80.2	.009	23.3
27	2.0	2.0	10523	73.0	20.1	0.0	0.0	6.9	74.6	.004	28.1
28	2.0	2.0	9175	69.0	26.4	0.0	0.0	4.6	81.4	.033	11.8
29	2.0	2.0	5796	68.9	20.7	0.0	0.0	10.4	66.9	.025	17.1
30	2.0	2.0	4155	71.0	21.0	0.0	0.0	8.1	78.1	.001	20.2
31	2.0	2.0	9457	74.6	25.4	0.0	0.0	0.0	76.8	.088	16.7
32	2.0	2.0	7037	72.4	25.7	0.2	0.0	1.7	83.9	.091	17.2
33	2.0	2.0	9935	76.2	23.7	0.1	0.0	0.0	75.0	.048	20.0

CHAPTER 3

In Conclusion

Employing complex statistical procedures such as factor and cluster analysis is certainly a legitimate approach to developing peer groups. Indeed, some writers such as Terenziniet al. (1980) make a strong case for their use in preference to the simpler methodology illustrated above. Several cautions are in order, however. The statistical procedures will probably look like black boxes to most people. Despite that appearance, the procedures still depend heavily on human judgment. And while they are easy to employ, they are difficult to thoroughly understand. In sort, the heavy statistical approaches are vulnerable to challenge in the political air of the decisionmaking arena, and often in the technical arena as well.

By and large, we believe that an institution seeking to develop a group of peer institutions will be better off employing relatively simple analytical procedures, while spending most time and effort on the overall *process*—the objectives, political issues, communication, involvement, and so forth—within which data on comparison institutions are to be developed and used.

CHAPTER 4

State of the Art

In this chapter, we consider the current situation with respect to comparative data from several vantage points: the major sources of data, what we know of the quality of at least some of these data, and the state of the analytic art. We conclude with some administrative guidelines regarding data quality and data presentation.

Sources of Comparative Data

An institution may obtain data on other colleges and universities directly from those institutions. We will discuss that approach later on. The bulk of the chapter concerns secondary sources, from which most comparative data on institutions of higher education emanate.

Federal Sources

The basic, broad responsibility for all levels of education belongs to the states. Among the several specialized roles taken up by the federal government is the gathering of nationwide statistics on colleges and universities. Data on a few higher-education variables go back as far as the Census of 1870. The U.S. Office of Education first sent surveys to institutions in 1929-30. The current, most broadly based federal effort, the Higher Education General Information Surveys (HEGIS) of the National Center for Education Statistics (NCES), date from 1966. The National Science Foundation (NSF) surveys, another major source of institution-specific data, began in 1954.

From the federal perspective, the main purpose of HEGIS is to provide information for federal policymaking. The utility of HEGIS data for interstate or interinstitutional comparisons is only a side benefit from the federal standpoint, while being of primary importance to many states and institutions.

The HEGIS system at NCES consists of a series of surveys, some conducted annually, others every two or three years—or even less frequently. Over the years, some changes have been made in both the scheduling and content of the surveys. Although completion of the HEGIS surveys is voluntary, compliance continues to run at about 90 percent—and higher than that if one ignores certain types of specialty institutions included in the HEGIS universe of about 3,300 accredited institutions. As of 1982-83, HEGIS included the following surveys:

Finances
Enrollments
Earned Degrees
Employee Compensation
Libraries
Residency and Migration
Facilities
State Expenditures

The first four surveys normally are done annually. The last, on state expenditures for higher education, was conducted first in the fall of 1982. The only HEGIS survey that does not contain institution-specific data, it will have value for direct comparative purposes only at the state level but will also be an additional source for contextual, environmental material relevant to institutional comparisons.

As the survey titles indicate, the HEGIS system covers a wide range of topics that can be useful for comparative purposes. The specific contents of the individual surveys cannot be reviewed here; administrators should have no trouble locating copies, however. Suffice it to say that much of the basic data one might need for institutional comparisons are included in the HEGIS system. It is not complete, of course. Examples of data elements not in the system include the number of part-time faculty, the number of support staff, student credit hours, noncredit enrollment, some reserve funds, and the amount of student aid provided from institutional sources. Neither costs nor enrollments are available at the departmental or discipline level. Thus comparisons based on HEGIS must essentially be institutionwide.

The HEGIS data base is truly an enormous resource, and no small achievement. The data are in the public domain, apart from some minor exceptions having to do with some faculty salaries. The data base can be accessed in essentially three ways. Data can be purchased in machine-readable form on magnetic tapes directly from NCES. This should be done only by institutions that have adequate staff and computer equipment, and a willingness to have staff spend some time becoming familiar with the tape formats. Special reports can be requested from NCES, and the agency also publishes annual reports based on HEGIS. The data in the published reports (for example, *Condition of Education* and *Digest of Education Statistics*) are highly aggregated, but they do provide some institutional norms for comparative purposes. Finally, analytically minded organizations that regularly work with the HEGIS data tapes can be a source for HEGIS data. We have already put forward the best example. Since 1980, formal procedures have been in place at NCHEMS to provide administrators and analysts around the country with access to virtually the entire HEGIS data base. (Some data from the 1960s may not be available.)

The surveys of the National Science Foundation are another large-scale, but somewhat less ambitious, federal data-collection effort. NSF does these four surveys related to higher education annually:

Graduate Enrollment in Science
Science and Engineering Personnel
R&D Revenues and Expenditures
Federal Grants and Contracts

The first three are based on institutional records, the last on the records of federal agencies. The universe of institutions is far smaller than the HEGIS universe and varies considerably by survey. The content is also more limited and focused, and varies year to year. But it does permit certain financial comparisons at a lower level of aggregation—for instance, at the level of "electrical engineering"—than does the HEGIS system. NSF publishes a number of different reports based on these surveys, some of which contain institution-specific data. NSF also sends annual reports containing normative data to participating institutions, and through a subcontractor, it sells magnetic tapes containing the survey data. Alternatively, NSF data can be obtained through third parties such as NCHEMS. While current HEGIS tapes contain one file per survey per year, the NSF data are maintained and provided as longitudinal files. For example, one tape will contain 10 years of data on graduate enrollments in the sciences. (Longitudinal HEGIS tapes are currently being developed.)

The Office of Civil Rights also conducts surveys of colleges and universities. The resulting data could be useful for a limited set of comparative analyses. However, they are not readily accessible.

State Sources

The tremendous growth in public higher education after World War II was a strong stimulus to statewide coordination and planning. Most planning efforts included an information-system component. Many states now maintain extensive data bases on their public institutions, and sometimes data on private institutions as well. In some instances, the state data base coincides with HEGIS data for state institutions. In other cases, state data may be more or less detailed and may include data elements different from those used in the HEGIS system.

Differences among the states in population, the role and scope of their higher-education institutions, reporting requirements, and such make generalizations difficult. But in pursuing state-level data, contacting coordinating agencies or institution-level boards of regents or trustees is usually worthwhile. A quick way to get a sense of what is available in published form from all of the states is to work through the State Higher Education Executive Officers (SHEEO). Their office and library are currently housed at NCHEMS.

Associations and Institutions

The nation's three regional higher-education associations are also sources of comparative data. They include the Southern Regional Education Board (SREB), the New England Board of Higher Education (NEBHE), and the Western Interstate Commission for Higher Education (WICHE). These organizations are especially useful for interstate comparisons in their respective regions but generally less so for interinstitutional comparisons.

Numerous special-interest associations gather and maintain data on individual institutions or can at least provide normative data by type of institution. These sources include at least the following (and there may be others):

American Association of Colleges of Nursing
American Association of Community and Junior Colleges
American Association of Medical Colleges
American Association of State Colleges and Universities
American Association of Universities
American Association of University Professors
Association of Physical Plant Administrators
Association of Research Libraries
College and University Personnel Association

College and University Systems Exchange
Council for Financial Aid to Education
Council of Graduate Schools
National Association of Independent Colleges and Universities
National Association of State Universities and Land-Grant Colleges
National Association of Trade and Technical Schools

Access to the data maintained by these associations, both regional and special interest, can be obtained through their publications or through direct request.

Other Secondary Sources

Several universities gather and make available particular kinds of comparative data, including the University of Alabama (statistics on schools of education), Oklahoma State University (faculty salaries for a sample of state colleges and universities), and the University of Arkansas (administrative salaries at doctorate-granting universities). The University of Arizona has developed what is probably the cleanest longitudinal-data file on enrollment now available—for all accredited institutions, dating from 1965. Again, these data are accessible in published reports or by contacting the institutions.

Various special studies are published that occasionally contain normative data useful for comparison purposes. Perhaps the best known is Alexander Astin's annual Cooperative Institutional Research Program (CIRP) study of the background, attitudes, and goals of college freshmen. M. M. Chambers does an annual survey of state appropriations by state and by institution. Portions of the Astin and Chambers surveys appear regularly in the *Chronicle of Higher Education*. The *Chronicle* also carries a series of other surveys on a range of topics; these can help establish norms by type of institution. The American Council on Education (ACE) uses a panel of institutions for surveys on issues of current interest; results are available in ACE publications. The National Association of

Colleges and University Business Officers (NACUBO), in conjunction with the American Association of Community and Junior Colleges (AACJC), does an annual financial survey of a sample of community colleges; the results are published in NACUBO's *Business Officer*. John Minter and Howard Bowen have used samples of both private and public colleges and universities to do annual assessments of institutional financial well-being. These data may be useful as normative for some types of institutions. Portions appear in the *Chronicle of Higher Education*, and the full studies are available as separate publications. The National Association of State Scholarship and Grant Programs publishes the results of its annual survey of state student aid; these data can be used only for state-level comparisons. *Higher Education Financing in the 50 States*, by McCoy and Halstead (1982), is a 500-page document containing an extensive set of comparative data on the states and their institutions of higher education, both public and private. NCHEMS plans to publish updates of this study annually.

The largest collection of literature on higher education is found in the Educational Resources Information Center (ERIC) system. Although it is not a major source of comparative *data*, the ERIC collection contains numerous one-time studies, some of which contain data potentially useful for comparative purposes. Indeed, it is a primary source for data about such topics as attrition and retention, where no national survey data are available. The collection can be searched electronically through a key-word system, for which indexes are available in most college libraries. Many university libraries maintain the entire ERIC collection, which currently numbers roughly a quarter-million items, in microfiche form.

Every year, a set of publications appears that provide snapshots of most of the nation's colleges and universities. The *College Blue Book*, *Lovejoy's Guide to College*, the *College Handbook*, *Barron's Guide to Colleges and Universities*, and Cass and Birnbaum's *Guide* are well known. These publications are especially useful for institution-specific data on institutional selectivity—test scores, class rank, application-acceptance ratios, and such; these data are not readily available elsewhere. The institutional snapshots are also handy at the stage when a comparison group is being developed. The College Board publishes more specialized documents, the *College Cost Book* and the *Index of Majors*, which are useful for comparing tuition rates and curricula across institutions. The annual *Higher Education Directory* contains just a few data elements relevant to comparative analyses, but it covers virtually all accredited institutions and indicates both institutionwide and program-specific accreditation.

Institutional Arrangements

Occasionally, colleges and universities will cooperate to produce and share comparative data. The immediate goal may be a one-time study. A well-known example is the California and Western Conference Study (Middlebrook 1955), a cost and productivity analysis involving a dozen research universities. Sometimes, data-exchange procedures will be established as part of a long-standing formal association of institutions. A good example is the American Association of Universities, which includes among its activities a limited sharing of data. Institutions with common sponsorships may also be involved in data exchanges. For instance, the MINDS data-sharing system serves more than 70 private institutions affiliated with the Methodist church. These formal arrangements usually involve institutions with generally similar missions, and thus provide a good start if that sort of peer comparison group is desired. Innumerable informal data-exchange arrangements must exist across the country. They may be part of more comprehensive cooperative efforts, or established entirely for their own sake. Sometimes, for example, institutions in a particular urban area that have little more in common than location will regularly share data.

Data Quality

Because comparative data are available from a multitude of sources, the overall quality of such data is difficult, if not impossible, to assess. Furthermore, the concept of data quality is itself complex, and certainly open to various interpretations. *Quality* might be taken to refer primarily to certain inherent properties of the data, such as accuracy. But it might instead be taken to refer to particular uses of the data, such as strategic planning versus efficiency comparisons, or to the manner in which the data are used—for example, in disaggregated rather than aggregated form. All these issues have something to do with quality in a broad sense.

In light of the multifaceted nature of data quality, we will suggest a few general principles that the administrator can employ in making a priori assessments of the quality of data in particular situations. We will also look in more specific terms at HEGIS, because it is the major source of comparative data accessible to all. By way of introduction, we will briefly discuss inherent data properties that have to do with quality.

The quality of data has three inherent determinants—validity, accuracy, and reliability. Each property relates to measurement. *Validity* concerns the extent to which the data actually measure or code what they are intended to describe. Assuming for the moment that SAT scores are good indicators of academic ability, is the average SAT score of entering freshmen a valid measure of the academic ability of the entire undergraduate student body? In the context of comparisons, validity takes on additional meaning. First, to extend the SAT example, note that the same measure—average SAT score—could have varying degrees of validity from one institution to the next: contrast the institution where most entering freshmen take the SAT exam with one where only 10 or 15 percent do. Or contrast the highly selective institution, where 80 or 90 percent of entering freshmen are still around as seniors, with the less selective institution that loses 30 or 40 percent of its freshmen after the first year. Second, while "SAT score" has a denotation that is likely to be consistent from one place and time to another, lots of other measures do not have a similarly consistent denotative meaning: number of FTE students, cost of instruction, amount of student aid, number of programs, revenues from gifts and grants, and so on. The list is long, and it contains many descriptors of great interest from a comparative perspective. In short, when doing comparisons, the validity of data becomes more difficult to assess. The measure and the concept should be well matched. Also, the measure must be equally appropriate in other locations and must be performed in similar fashion in each of those locations.

Accuracy and *reliability* also become more problematic in a comparative mode, but neither concept is ambiguous. The extent to which measurement or coding is free of error (accurate) and will agree with the measurement or coding of another observer (reliable) becomes more problematic because comparisons require that data be recorded in more than one location or circumstance. The building of a national, comparative data base is the extreme case. Imagine, if you will, the situation each fall as literally thousands of registrars count (possible error) the number of various types of students (possible error) and encode the results on a survey form (possible error). The forms are sent to a central location and their contents are entered into a national data base (possible error). Reports are generated from that data base (possible error). Data from those reports are then incorporated into documents for use at a particular institution: the incorporation may involve merely copying the data, but even so simple a procedure harbors potential for error that can diminish accuracy or reliability.

We think that any empirical comparison (that is, any comparison based on data) will involve data that are to some degree invalid, inaccurate, or unreliable. In chapter 2 [p. 21], we suggested ways to minimize the threat of data error in financial comparisons. Here we want to address a related, though somewhat different, concern: How can an administrator quickly assess the likelihood of error and the consequences thereof, even at the earliest stages of a proposed comparative analysis?

The first principle to keep in mind is that the more complex the entities (departments, institutions, state systems) being compared, the greater the chance for error. There are more things to count and record when dealing with the more complex entities, and many more relationships, crossovers, and shared resources to account for. For instance, comparing institutions whose primary mission is instruction is easier than comparing institutions whose mission involves major efforts in research and public service as well as instruction. Indeed, we have noted that it may be a practical impossibility to iron out all of the discrepancies in data-recording practices among major research universities (Topping 1979).

Second, issues posed for comparative analysis can range from the simple and straightforward to the complex and byzantine. Tuition rates usually can be compared with little danger of misinterpretation or other sorts of error (although one must be wary of how "general fees" are treated). But the chances are slim that one could compare expenditures for athletics at most institutions without encountering all sorts of errors. Faculty workload is another inherently difficult issue; it is surprisingly hard to measure in a manner that is error-free and that will not be haughtily impugned. A first consideration, therefore, is whether the issue in question can be dealt with in a straightforward manner on one's own campus. If it cannot be, expect serious problems in attempting comparisons. The broad maxim is that almost every kind of ambiguity is pregnant with the possibility of data errors. The academic dean's office seems to be part of the administration *and* the instructional area. Some students insist on majoring in more than one subject at a time. The computer is now used by everybody, but costs often are still allocated as they were in the days when only the science and math departments used it. Summer school may overlap two fiscal years. Counselors may do both academic and personal counseling. Federal student-aid funds come into the institution and are allotted to students, who thereupon give all or most of the money back to the institution. There is enough ambiguity present in each of the circumstances we have cited to lead people of sound mind and good will to count and allocate in quite different ways.

Third, there are graduations in the "secondariness" of data. Strictly speaking, use of data collected by another is a secondary use. In a practical sense, the prospective user may be fairly close to secondary data through direct contact with and knowledge of the person who collects the data, or because the collectors have taken the time to adequately document what they did and the assumptions they made. On the other hand, the user can be relatively far from the data even when they were generated at the user's own institution. Consider a time-series comparison when no one remembers, and there is no record to indicate how the early data were gathered, or how carefully. Other things being equal, the chance for error is likely to increase with the "distance" between the user and the data source, particularly with respect to validity. So initial assessment of a proposed comparison involves the question: What do we know about the proposed data source, including collection procedures, motivation, and maintenance responsibilities? A corollary determination is whether it is possible and feasible to get closer to the data source, should that be appropriate.

Finally, we recommend that the entire data-quality issue be addressed within the framework of the intended use of the comparative data. In this context, *use* can be taken in two senses. One has to do with the *form*, or *manner*, in which the data are handled and presented. For instance, data accuracy will be less important if data will be used in a highly aggregated form. Suppose one were to compare the change over time in the proportion of degrees awarded in the humanities by a group of liberal-arts colleges. Even granted that common definitions are in use, some measurement error is likely. But if the comparing college lumps the responses from the other institutions, and compares its own data with the aggregate data (means, medians, or whatever), inaccuracies will tend to wash out, barring some systematic error. Similarly, comparative data from various departments or institutions can be used in a cross-sectional analysis, using techniques such as analysis of variance or linear regression. In a regression approach, an institution can evaluate its actual performance by comparing it to a performance level predicted by the model (based on what the group as a whole did). Again, inaccuracies in the data tend to average out. By contrast, head-to-head comparisons between departments or institutions or states usually will require a relatively higher degree of data quality, at least as regards accuracy and reliability.

In the second sense in which the use and the quality of comparative data are related, quality per se is not affected by the use. Rather, the use dictates, or circumscribes, the level of quality needed. It is widely accepted that the characteristics of information (useful data) needed to support strategic planning are different from those needed to support management control or operational (transactional) activities (Gorry and Scott Morton 1971). At the strategic level, information need not be highly accurate or precise: knowing that enrollment is around 3,500 FTE students would be no less useful than knowing that the exact number was 3,524 on the census date. At the operational level, of course, the enrollment of each and every student is duly recorded. And at the management-control level, the revenues generated by the additional 24 students could have a meaningful impact on cash flow and budget balancing. Similarly, information for strategic planning usually can be less current and less disaggregated than that employed for operations or management control. By considering the level of decisionmaking that the analysis is intended to support in conjunction with the other elements of the assessment we have discussed, it should be possible at the outset to estimate where the data problems are likely to be encountered, how severe they are likely to be, and whether they can be tolerated.

Quality of HEGIS Data

Among the multitude of sources of comparative data, HEGIS is particularly well known and most widely used. The HEGIS system embraces eight national surveys. While data quality probably varies across all of the different types of data in the system, we will look at only three of the surveys—finances, enrollment, and earned degrees—because so far, they are the only ones that have been evaluated at length.

The quality of HEGIS financial data has been studied from the perspective of the states as well as from that of individual institutions. On the institutional side, one evaluative strategy has been to compare HEGIS data to audited data that were coded to AICPA-NACUBO standards, and then to ask two questions: Have the institutions provided valid data by following HEGIS instructions and reporting what was requested? Are the HEGIS data accurate, reflecting correct counting and recording? The results are reported in Conger (1979), Minter and Conger (1979a,b,c), and Patrick and Collier (1979), and summarized in Stroup (1980). In brief, there are two major findings. The first is that there is considerable discrepancy between HEGIS financial data and data coded to AICPA-NACUBO standards. For example, for fiscal year 1977, about 20 percent of the 125 private institutions studied either overreported or underreported instructional expenditures by 15 percent or more. The figures were worse for academic support, student services, and institutional support but somewhat better on the whole for data on revenues by source, such as tuition and gifts and grants (Minter and Conger 1979a). The investigators conclude that disaggregated HEGIS financial data should be used with extreme caution. The second major finding was that HEGIS financial data in the aggregate compare very favorably with the audited and coded data (Patrick and Collier 1979). As one might expect, the reporting errors tend to cancel each other in the absence of systematic error.

Other studies of the quality of HEGIS financial data from an institutional perspective have relied on surveys of or interviews with users of the data. The net result has been laundry lists of typical problems, such as the failure of institutions in systems to include their prorated share of the revenues and expenditures of the central administration, or the fact that NCES will sometimes infer data for institutions that fail to respond to the survey. (See Hyatt and Dickmeyer 1980 for more examples, as well as chapter 2 of this book.) On the whole, this second group of studies leads to a somewhat more sanguine view of the quality question—a general feeling that HEGIS data quality is improving (Andrew, Fortune, and McCluskey 1980).

From the state perspective, most of the study of financial data has focused on the ways in which state practices and structures are different enough to undermine the comparability of HEGIS data from one state to another. The most thorough account of the differences, and the ramifications for data quality and comparability, can be found in Ryland (1981). Overall, her study suggests that the differences in state practices for funding higher education (some of which we noted in chapter 2) are such that complete data comparability across states is not achievable. Moreover, omissions in the HEGIS data—especially regarding student aid, retirement benefits, and vocational education—result in underestimates of state support for higher education. Once more, it is well to proceed with care.

The quality of HEGIS data looks somewhat better in the other two areas studied: enrollment and degrees awarded. In the WESTAT study of these areas (Peng 1979), HEGIS data were compared to reconstructed data, interview responses, and audits of original reports. The study indicates that the quality of these two types of HEGIS data is generally quite good in the aggregate; error rates were typically less than 1 percent. Problems were encountered, however, with disaggregated data of both types. On the enrollment side, more than 25 percent of the institutions studied did not follow NCES classifications for detailed student levels; distinguishing first-time freshmen was one common problem, especially for two-year colleges. Inconsistency in the way institutions defined full- and part-time students was also noted. With earned-degree data, significant problems were not found at the level of major fields (for example, biological science). But problems appeared when disaggregation was taken to the level of program categories (for example, molecular biology) within major fields. Double majors also were the source of inconsistencies in classification from one institution to another.

As for the quality of HEGIS data in general, a survey of higher-education institutions and state agencies showed that 85 percent of the respondents felt that the accuracy of the data was acceptable or better (Andrew et al. 1980). In a related study by the same investigators, interviews with 75 higher-education researchers, financial officers, institutional researchers, and academic planners revealed a solid consensus that HEGIS data were accurate enough at the aggregate level. With the exception of the financial survey, the data were deemed accurate enough for analysis and comparisons down to the institutional level (with some reservations about aspects of data on ethnic membership, part-time enrollments, and faculty salaries).

On the whole, the quality of data from particular sources such as HEGIS and others is a fairly complicated matter. Too much so, we would argue, for most administrators to tackle, considering their other responsibilities. But there is a need for an institutional capacity to address this aspect of data quality, if comparative data are to be used with confidence. Information specialists—planners, institutional researchers, and sometimes assistants to the dean or president—are often the best persons to take on the responsibility for assessing data quality, since it may well complement their other duties.

State of the Analytic Art

Although important technical issues relate to the use of comparative data, we believe that from an administrative perspective, the key issues are not so much technical as managerial. Using comparative data on a campus is a process that may misfire, even if the data are good and the technical analysis is sophisticated. Or it may valuably support decisionmaking, even if the data are marginal and the analysis barely adequate. To be successful, the process needs to be managed and looked after. Turning it over to a technical staff, however competent, is unlikely to be sufficient. In this and earlier chapters, we have described at length the comparative analysis and the administrator's role in it. We have only a few comments to add.

First, stay abreast of human interventions. That an investigation is empirical, based on data, certainly does not mean it is totally objective. It is never enough merely to let the facts speak for themselves. Those who work with data know better, especially in the context of which we speak. The reality of the higher-education enterprise is far richer, far more complicated, than the meager data we have can depict. Subjectivity, in the form of human intervention, colors nearly all data analysis: "We couldn't get this year's data, so we used last year's instead." "We decided to make the cut here." "We chose to use medians as the measure of central tendency." "We picked 1976 as the base year." The administrator should be apprised of these intervening decisions en route. They will be technical, in varying degree. But generally speaking, the choices ought to make sense to the administrator, who should feel comfortable that the choices made do not jeopardize the project.

Second, take all due care to optimize the impact of the analysis. Make sure that the effort is not wasted (while acknowledging that there will be those who would just as soon have it be otherwise. In this regard, it is essential to convey information in such a way that it will be understood correctly. Reporting the findings of a comparative analysis is not fundamentally different from reporting empirical findings generally. But it may require extra care to ensure that the comparative data will not be misleading. Comparative data are more likely to be misinterpreted because they usually are less familiar to potential users than data that refer to internal matters only. Internal data are relatively well understood by most who work in the organization; obvious errors will likely be spotted by veteran observers who have developed a sense of the normal range for particular variables. That intuitive sense is less reliable when applied to the performance of a variety of other, unfamiliar departments or institutions.

Specifically, the following steps should be taken:

1. *Adhere to basic data-presentation standards.* In some ways, comparative data are especially liable to being presented in a misleading way. For example, an institution's performance will often be compared to a group norm, which will be an average of some kind. If it happens to be a statistical mean, it is subject to the effects of very large or very small values, especially if the sample size is small—and it often is, in a comparative analysis. An obvious way around this problem is to present both the norm and the individual data values. That way, readers can judge for themselves how well the norm represents the collective behavior in question.
2. *Provide appropriate background material.* Three aspects of need require consideration. First, how familiar is the audience with higher-education issues, higher-education data, statistical routines, and the like? Perhaps a general briefing is needed. Second, what additional data might help the audience understand a particular comparative relationship? For instance, suppose one were comparing changes in average faculty salaries over a number of years at several institutions. It would help the audience understand the comparative results if data could be provided on the proportions of continuing and new

faculty each year at each institution. Third, the audience has a right to know about the human interventions that affected the results, and about data and analytical problems that could be affecting the results. Caveats, qualifications, and other explorations should be suitably integrated with the comparative data, so that it will be hard to ignore or overlook them. It is not unusual for a report to have secondary and tertiary audiences. They too deserve a more complete picture than the data alone is likely to provide.

3. *Select an appropriate mode of presentation*. Several times we have noted that data do not become information automatically. Indeed, information can get lost amid too much data. So when planning presentation of a comparative analysis, in which numbers are sure to abound, take time to consider what might be the most effective mode of presentation for the primary, intended audience. A board of trustees may have rather different preferences in this regard from those of a legislative committee or a faculty senate.

To conclude, we advocate a strong managerial role for administrators in the development of a comparative analysis. We think they ought to be involved from beginning to end. There are just too many potential problems to adopt a hands-off, laissez faire attitude. In the end, the state of the art in comparative analysis is determined by administrative skill as much as by technical virtuosity.

CHAPTER 5

Hereafter: Projections and Recommendations

From the outset, we have tried to keep in mind Voltaire's observation that "the secret of being a bore is to tell everything." And the state of the art of prognostics being what it is, we feel doubly justified in quickening the pace of discourse at this point. In the remaining few pages, we indulge in hunches and guesses and express some preferences for the future, about which our data are not altogether complete.

The National Outlook

The federal data-collection effort on higher education began around 1870, then took a quantum leap forward in 1929-30 under the auspices of the U.S. Office of Education. The next major advance came in the mid-1960s with the HEGIS effort described in the preceding chapter. Another significant contribution to the national data pool, the National Science Foundation Surveys of higher-education institutions, began in the 1950s. Together, the HEGIS and NSF files constitute a substantial resource for comparative data. What does the future hold for those systems?

There is little basis on which to construct long-range forecasts. In the near term, however, it appears that the NSF data-collection effort will continue in its current form, while HEGIS will be under some pressure to contract in scope. The pressure to restrict HEGIS reflects the desire to hold down federal expenditures and reduce the amount of paperwork imposed by the federal government. Thus far, the effects on the HEGIS system have been modest. A major survey, on institutional characteristics, was eliminated in 1982-83, but another, on state-level expenditures, was added. One or more additional surveys may be dropped, but we think it more likely that they will be conducted less frequently. There are advocates both for and against the present configuration of the HEGIS system. Support is widespread for the basic proposition that the federal government should play a key role in gathering statistics on higher education. The debate mainly concerns how much and for what purposes. In any event, it seems most unlikely that the HEGIS system will be significantly expanded.

Other forms of higher-education data collection on a national scope are likely to continue to play a supportive yet important role. Wide interest in enrollment, faculty salaries, tuition, and finances should ensure that data will be collected annually from at least a sample, if not all, of the nation's colleges and universities. Some changes can be expected. On occasion, it may be just a case of passing the responsibility for the survey from one organization to another. For example, the enrollment survey conducted for many years by the University of Cincinnati will be done in the future by the University of Alabama. And new surveys appear from time to time. An example is the salary survey by the College and University Personnel Association (CUPA) and the American Association of State Colleges and Universities (AASCU) initiated in 1982. The outlook is not entirely positive, however. Some current surveys may be curtailed because of financial constraints. National surveys are sometimes peripheral to the mission of the sponsoring agency. For instance, the Washington Coordinating Board for Higher Education conducts an annual tuition survey as a means of generating background data to inform tuition-setting in that state. Continued severe state-level financial constraints could put such survey efforts in jeopardy.

The State-Level Outlook

Far-reaching and widespread higher-education data collection at the state level is a post-World War II phenomenon. It was fueled for the most part by tremendous growth in the enterprise. For most states, but not all, this growth is over, at least for this century. Enrollment declines already begun in some states are expected to continue apace through this decade. Ironically, severe decline creates as much need for comparative data as growth creates—and perhaps more.

The need for comparative data will be felt strongly in states that encounter continuing financial difficulties, regardless of their enrollment experience. Sustained national economic recovery presumably will relieve the strain in most states. Short of that, many states will face hard choices between higher education and other social services, and within the panoply of services offered by their systems of higher education. Comparative data will be sought as a means of rationalizing those choices or justifying those made on other grounds. Probably the only impetus acting against data collection under these circumstances will be the cost of the collection and analysis effort.

The Institutional Outlook

With respect to individual colleges and universities, the prospects for the future use of comparative data are intriguing. The demand for such data likely will remain high, for both management control and strategic planning. We do not foresee substantial change in the underlying dynamics operating on the current need for comparative data.

Granted that continuing need, developments will focus on the form of use and the mode of transfer of comparative data. Most administrators today are likely to find comparative data, along with other data they themselves use, residing on a sheet of paper. We expect that in the future, the data will reside instead in a microprocessor. For some, this will amount to little more than a change in the record-keeping system. Others, though, will recognize the wider opportunities afforded by these new electronic tools—in particular, the ability to manipulate data and relationships among data in a dynamic mode. "What if" games, evaluation of multiple strategies, and so forth will become as available to the typical administrator as the copying machine is now.

Will comparative data turn up in microprocessors dedicated to high-level administrative uses? One would hope so. What we envision is administrators routinely looking beyond their institution's operating data base to get information. Once obtained, external data can be merged with aggregated internal data to support analyses helpful to decisionmaking. We do not wish to oversell the new electronic tools or, for that matter, the data that may be manipulated with them. There simply is *no substitute* for good judgment on the part of those principally responsible for the well-being of our colleges and universities. But the decisionmaking process should be *supported* as best we are able. The new tools can help in this regard. And in the process, they will enhance the utility of comparative data.

The microprocessor will prove to be more than a new host for data. It offers the prospect for great improvements in data transfer. Electronic linkages among computers (or terminals) creates a new situation with respect to both networking and access to central data bases. Networks among institutions for the purpose of sharing data can become more interactive, faster, and more responsive to the exigent needs of the decisionmaking process than the best arrangements of the past. The same can be said for central data bases: even as we write, the list of on-line data bases grows daily. Much of the data currenty available is more suitable to research than to administrative purposes, but it is just a matter of time before that situation is corrected. Actually, some opportunities already available, such as electronic access to the *New York Times*, have utility for the administrator in higher education. In store is electronic access to data bases, dedicated specifically to higher education, like those maintained by NCES and NCHEMS. Indeed, EDUCOM has already begun an electronic data-sharing service on a trial basis. Participating institutions share financial data with one another electronically, in effect creating their own comparative data base, while simultaneously gaining access to a computer-based modeling tool (EFPM) with which to analyze and manipulate the data.

What to Do

A basic premise of this book has been that comparative data are here to stay. They will be used. Administrators will continue to be asked to supply data for comparative purposes; they will find themselves having to explain and interpret such data with respect to their own departments or institutions. On these assumptions, it seems sensible for administrators to take at least some modest steps to enhance the utility and minimize the risks of using comparative data.

The task can be addressed from two perspectives—that of the user of comparative data on one's own campus, and that of a participant in the larger state and national comparative-data efforts. From the institutional point of view, several issues are worth considering. First there is the matter of a general stance toward comparative data. Despite all we have said about its virtues, we would not claim that comparative data are typically "of the essence" or that they should be ubiquitous. Only rarely, as in determining comparative advantages, are such data crucial. More often, they are a source of background information that can improve interpretation. For management purposes, it does not make much sense to round up a lot of comparative data for their own sake. If we have learned anything over the years, it is that lots of data do not necessarily translate into lots of information. The sound strategy is to choose with care the issues on which comparative data are to be gathered and used. Discourage shotgun approaches.

A second internal strategy concerns building and maintaining a capacity to acquire comparative data and to do comparative analysis. As a foundation, resources have to be assembled and maintained. We see great utility in considering the development of this particular capacity as part of the more general process of providing information for management. We follow Jones (1982) and others in thinking that an institution can best come to grips with that process by focusing on the role of information specialists. However, the *use* of comparative data on the campus should be viewed as essentially a management task, under administrative control.

From an external perspective, it must seem that the institutional administrator can do little but wage a rear-guard action, trying to keep the data requirements of external agencies, and their attendant costs, to a minimum (Floyd 1982). But perhaps the period of consolidation we are entering offers an opportunity for institutional officials to exert another kind of influence. Essentially, they should advocate a few basic principles. First, the inclusion of any data element in the external system should be justifiable on management grounds. That is, it should be reasonably obvious what sort of information is to be gleaned from the data provided. And the adequacy of the data system to support management (including policy analysis) is the proper issue, rather than its comprehensiveness per se. Second, maintaining data quality should be a shared responsibility. Institutional officials can insist that external agencies make adequate efforts to ensure that the data they collect meet appropriate standards for validity, reliability, and accuracy. At the same time, the institutions themselves should be willing to assist in identifying data quality problems (Hyatt 1982). They have much to gain by carefully attending to their own provision of data to those external systems. Too often, the source of bad data about an institution is the institution itself. Third, institutions should insist on a usefully complete and prompt return flow of data from the collection agency. Closing the loop will give all concerned a larger stake in the data, thus enhancing prospects for quality and for maximizing the utility of the comparative-data resource.

PROJECTIONS AND RECOMMENDATIONS

To Shakespeare, comparisons were "odorous," and to John Lydgate (writing in another period of want for higher education) they were a source of "gret grevaunce." We prefer to end this small book on the note sounded by Ivan Petrovich Pavlov:

"Learn, compare, collect the facts!"

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